DOCUMENT RESUME

ED 205 418 SO 013 474

TITLE	Food Additives: "Eat, Drink, and Be Healthy". Health and the Consumer.
INSTITUTION	Florida State Dept. of Education, Tallahassee. Div. of Elementary and Secondary Education.; Osceola County School District, Kissimmee, Fla.
SPONS AGENCY	Bureau of Elementary and Secondary Education (ED), Washington, D.C.
PUB DATE	79
NOTE	217p.; For related documents, see SO 013 473-478. Not available from EDRS in paper copy due to colored ink throughout original document.
AVAILABLE FROM	Project SCAT, Osceola County School District, P.O. Box 1948, Kissimmee, FL 32741 (Six units in this series are $29.50, for cost of each unit contact the project).
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Advertising; Bibliographies; *Consumer Education; Foods Instruction; *Health Education; Learning Activities; *Nutrition Instruction; Resource Materials; Secondary Education; Teaching Methods; Units of Study; Validated Programs
IDENTIFIERS	*Food Additives; *Project SCAT

ABSTRACT

One in a series, this consumer education learning activity package teaches secondary students about food additives. The package includes instructions for the teacher, suggestions for activities, lists of resource materials, film guides, student activity worksheets, a student resource booklet of background readings, and answer keys. Content taught includes what additives are, the reasons for using them, the different kinds of additives, the safety questions surrounding them, how manufacturers use additive issues in advertising, and how additives are regulated. Students are involved in many different kinds of activities. Some examples follow. To learn about food additives students read and discuss government, consumer, and industry publications. Students discuss the advantages and disadvantages of doing their own canning and baking. Small groups of students then research and report to the class on the history of home canning and the development of factory processing methods. In another activity, students conduct classroom experiments to detect the presence of additives in food. Students draft legislation, conduct taste tests, analyze television commercials, examine school menus, and take field trips. (Author/RM)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

ED205418

BEST COPY AVAILABLE

U S DEPARTMENT OF HEALTH.
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL IN **MICROFICHE ONLY** HAS BEEN GRANTED BY

Carey E Ferrell

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

HEALTH

AND

THE CONSUMER

SO 013 474

FOOD ADDITIVES: "Eat, Drink, and Be Healthy"

Skills for Consumers Applied Today

© 1979 BY THE STATE OF FLORIDA, DEPARTMENT OF STATE

Be it known that this consumer education instructional unit has not been endorsed by either the Florida Department of Education or the United States Office of Education; and that the points of view or opinions expressed do not necessarily represent the official policy of these agencies.

CURRICULUM DEVELOPERS

Willie Ausherman
Judy Zieg

ILLUSTRATOR

Richard Liput

CURRICULUM CONSULTANT

Rodney F. Allen, Ph.D.

PROJECT SCAT, OSCEOLA COUNTY SCHOOL DISTRICT, P.O. BOX 1948, KISSIMMEE, FLORIDA 32741
(305) 847-3147 SUNCOM 352-7440

Teacher PAL Tips

Welcome, teachers, to this $CAT Consumer Education Teacher PAL*. We hope you will find this a useful resource while you are teaching this subject. Features of this PAL include:

A CONTENT OUTLINE of the Student PAL subject matter to aid you in class discussions.

STUDENT OBJECTIVES which state in behavioral terms the objectives of the Student PAL.

SUGGESTED ACTIVITIES which you may wish to use as enrichment activities. These include:

INTRODUCTORY ACTIVITIES which give suggestions for introducing the topic.

DEVELOPMENTAL ACTIVITIES which give ideas for developing the major concepts in the Student PAL. These suggestions are keyed to each section of the Student PAL and include appropriate resources.

REVIEW ACTIVITIES which give suggestions to guide the culmination of the study.

RESOURCE suggestions which are of three types and coded as follows:

* Materials developed by $CAT and included in this Teacher PAL.

+ Commercially developed materials, available at a cost.

= Commercially developed materials, available free or on a free-loan basis.

ADDRESSES of the producers of all suggested resources as well as others which you may wish to contact for additional ideas and/or materials.

---

* Packaged Activities for Learning

A SPECIALIZED VOCABULARY which is an alphabetized listing of all the "Passwords" listed in the Student PAL.

FILM DESCRIPTIONS for each film suggested as a resource.

INSTRUCTIONAL AIDS which include Xerox masters for the Test, the Test Answer Sheet, Student Activity Sheets, Film Guides, and Transparencies which you may wish to use in your study.

ANSWER KEYS for the Test, $CAT-developed Activity Sheets, and all pages from the Student PAL requiring student responses.

A STUDENT PAL for your reference.

In addition, some pages in the Student PALs are designed specifically to encourage class discussions, and teacher-led discussions may be necessary to insure student comprehension of the concepts presented. Such pages in the Student PAL for this topic include:

Page 11:	Validity of using food additives for sales appeal
Pages 24-25:	Use of incidental additives
Page 26:	Validity of assertions about food additives
Pages 31-32:	Natural chemical makeup of foods
Pages 34-40:	Regulations governing food additives and resulting controversies
Page 42:	Making decisions on controversial issues
Pages 47-49:	Analyzing the connection between food additives and advertising
Page 57:	Reflecting on the government's role in regulating food additives

These features are suggestions only. You, the instructor, know your class best and should feel free to choose those activities and resources most appropriate for your students.

Table of C

PURPOSE 1
CONTENT OUTLINE 2
STUDENT OBJECTIVES 8

ACTIVITY CHARTS

  Introductory Activities 10
  Developmental Activities 14
  Review Activities 23
GENERAL RESOURCES -- ADDRESSES . . . 26
SPECIALIZED VOCABULARY 27
FILM DESCRIPTIONS 32

Contents

INSTRUCTIONAL AIDS . . . . BLUE
    TEST
    TEST ANSWER SHEET
    STUDENT ACTIVITY SHEETS
    FILM GUIDES
    TRANSPARENCY MASTERS
ANSWER KEYS . . . . YELLOW
    TEST
    STUDENT ACTIVITY SHEETS
    STUDENT PAL
STUDENT PAL . . . . GREEN

Food Additives

Food additives may be defined as any substance or mixture of substances, other than a basic foodstuff, that is present in a food as a result of any aspect of production, processing, storage, or packaging. Under current regulations approximately 3000 chemicals are intentionally added to our foods and another 10,000 chemicals can become part of our food through incidental means.

In the past few years, the government has removed several potentially dangerous chemicals from our foods, but there are substances which some people feel may be dangerous for human consumption still on the supermarket shelves. Therefore, many Americans are questioning the use of additives and are concerned about their safety.

EAT, DRINK, AND BE HEALTHY examines both sides of the issues concerning food additives. The consumer needs to be informed as to what additives are, the reasons for using them, the different kinds of additives, the safety questions surrounding them, how manufacturers use additive issues in advertising, and how additives are regulated.

Conte

I. Definition, purpose, source

   A. Substances added to foods during production, processing, storage, or packaging
      1. Intentional
      2. Incidental

   B. Reasons for using additives
      1. Improve nutritional value
      2. Enhance acceptability
      3. Improve the quality
      4. Make food more available
      5. Reduce costs
      6. Facilitate food preparation

   C. Source
      1. Natural
      2. Synthetic (created)

II. Kinds of additives

   A. Acids and alkalies
      1. Acids
         a. Fruit acids most common acidulant
         b. Intensify flavor in fruit products
         c. Add texture and tartness to cheese products
         d. 60% are citric acid
         e. Variety of others, all ending in "-ic"

nt Outline

2. Alkalies
   - a. Neutralize excess acidity in foods
   - b. Improve flavor and lengthen shelf life
   - c. Commonly found in wines, canned peas, and olives
   - d. Most widely used
     - (1) Ammonium bicarbonate
     - (2) Sodium carbonate
     - (3) Calcium carbonate
3. Leavening agents

B. Stabilizers and thickeners
1. Stabilizers keep solids and liquids from separating
   - a. Common in many food products
     - (1) Ice cream and frozen desserts
     - (2) Confections
     - (3) Chocolate milk and drinks
     - (4) Artificially sweetened drinks
     - (5) Pressure-dispersed whipped cream
     - (6) Cottage cheese
   - b. Three basic types
     - (1) Pure plant extracts
     - (2) Chemically modified natural products
     - (3) Synthetics
   - c. Widely used
     - (1) Carrageenan
     - (2) Dextrin

2. Thickeners provide consistency and body
    a. Used in many foods
        (1) Icings
        (2) Cheese spreads
        (3) Salad dressings
        (4) Pie fillings
        (5) Soft drinks
        (6) Frozen desserts
    b. Widely used
        (1) Gum arabic
        (2) Pectin
        (3) Gelatin

C. Nutrient supplements
    1. Improve nutritive value
        a. Enrich--replace nutrients lost in processing
        b. Fortify--add nutrients not already in food or at a higher level
    2. Generally vitamins and minerals
    3. Added to many foods
        a. Products made with flour (cereals, baked goods, noodles, etc.)
        b. Milk and fruit drinks
        c. Salt

D. Flavors and flavoring agents
    1. Largest group of food additives
    2. Flavors add distinctive tastes to foods
        a. Natural flavoring supply limited

b. Synthetic flavorings generally used
(1) Similar to natural
(2) More consistent in quality
(3) More economical
(4) Available year round
(5) Approximately 1600 synthetic flavorings
3. Flavoring agents act as flavor enhancers
a. Add no flavor of their own
b. Bring out natural food flavor
c. MSG most widely used

E. Preservatives
1. Oldest class of food additives
2. Maintain appearance and good taste
3. Increase the safety or shelf life of foods
4. Vary in type by purpose
a. Antioxidants
(1) Prevent undesirable change in color or flavor caused by oxygen
(a) Browning of freshly peeled fruit
(b) Rancidity of fats and oils
(2) Commonly used
(a) Ascorbic acid
(b) BHA and BHT
b. Inhibitors
(1) Delay or prevent growth of spoilage organisms
(2) Commonly used

            - (a) Salt and sugar
            - (b) Calcium and sodium propionate--used in baked goods
            - (c) Sorbic acid--used in cheese, syrups, mayonnaise and foods with fruit bases
            - (d) Benzoic acid--used in carbonated beverages and food with high acidity
        - c. Sequestrants
            - (1) Separate substances interfering with processing
            - (2) Citric acid--prevents clouding in soft drinks
    - 5. Processing methods also help preserve food

- F. Bleaching and maturing agents
    - 1. Widely used in baking and milling industries
        - a. Whiten flour and improve its baking qualities
        - b. Commonly used
            - (1) Chlorine dioxide
            - (2) Nitrosyl chloride
            - (3) Chlorine
    - 2. Bleaching agents also used in fats and oils and some cheeses

- G. Colorings
    - 1. Add eye appeal
        - a. Help determine consumer acceptance

b. Not necessary for food safety or quality

2. Used in many foods
   a. Soft drinks
   b. Candy
   c. Desserts
   d. Bakery products
3. Cannot be used to mislead consumers
   a. Conceal blemishes or inferiority
   b. Make food appear to have certain ingredients in it
4. Sources
   a. Natural
   b. Synthetic--comprise 90% of colorings used
5. Usually identified by color and number

H. Emulsifiers

1. Prevent separation of ingredients that usually do not mix
   a. Oil and vinegar in salad dressings
   b. Ingredients in peanut butter, chocolate, margarine, and ice cream
2. Widely used in hundreds of foods
   a. Natural substance lecithin
   b. Synthetics mono- and diglycerides

I. Sweeteners

a. Caloric
   a. "Sugar" = 100 chemical substances
   b. Commonly used
      (1) Sucrose--most widely used
      (2) Corn syrup
   c. High in calories

2. Non-caloric
    a. Beneficial to overweight individuals
    b. Saccharin
    c. Safety questioned
3. Reasons used
    a. Add "sweet" taste
    b. Add body, tenderness, and color
4. High percentage used in many foods

J. Other types of additives
    1. Firming agents
        a. Prevent softening of canned vegetables and fruits
        b. Calcium salts
    2. Anticaking agents
        a. Keep salt, sugars, and powders free flowing
        b. Sodium silico aluminate
        c. Calcium stearate
        d. Calcium phosphate
    3. Humectants
        a. Keep moisture in certain foods
        b. Propylene glycol--coconut
        c. Glycerine--marshmallows, confections
    4. Curing agents
        a. Preserve meat
            (1) Inhibit growth of botulism germs
            (2) Stabilize pink color
        b. Salt
        c. Sodium nitrate and nitrite

5. Foaming agents
    a. Help whipping qualities
        (1) Pressure packed toppings
        (2) Nitrous oxide
    b. Foam inhibitors--prevent foaming
        (1) Beverages
        (2) Mono- or diglycerides
6. Solvents
    a. Carriers for other additives or ingredients
    b. Propylene glycol

K. Incidental additives
    1. Not deliberately added to foods
        a. Become part of food during production, processing, packaging, or storage
        b. 10,000 known chemicals
    2. Agricultural chemicals
        a. Fertilizers
        b. Pesticides
        c. Animal and poultry drugs
    3. Industrial pollutants
    4. Packaging materials

L. Filth
    1. Not additives
    2. Some may be unavoidable
    3. May indicate improper storage or manufacturing practices
    4. Government inspections

III. Safety of additives

A. Toxins naturally present in food
  1. Small amounts of poisons
    a. Oxalic acid--spinach
    b. Solanine--potatoes
    c. Hydrogen cyanide--lima beans
    d. Arsenic--seafood
    e. Myristicin--nutmeg
    f. Acetone--coffee
  2. Human body has built-in defenses
  3. "Amount" very important

B. All foods are chemical

C. Small amounts of additives used
  1. Ppm--parts per million
  2. Ppb--parts per billion
  3. Ppt--parts per trillion

D. Laws regulating additives
  1. 1938 Federal Food, Drug, and Cosmetic Act
    a. FDA must prove unsafe
    b. Did not require safety testing
  2. 1958 Food Additives Amendment
    a. Delaney Clause
      (1) Not approved if carcinogenic
      (2) Not dependent on amount used
      (3) Few additives banned
        (a) Cyclamate
        (b) Some colors
      (4) Controversial issues
        (a) Amounts used

            - (b) Benefits vs. risks
            - (c) Animal testing
        - a. GRAS list
            - (1) Generally recognized as safe
            - (2) Excluded additives from scientific testing
            - (3) Presently undergoing extensive review

- E. Safety claims
    - 1. Useful in preserving food
    - 2. Harmless in small amounts
    - 3. Some additives safely used for years
    - 4. New additives undergo strict testing

- F. Safety questions
    - 1. May cause hyperactivity
    - 2. Additives once thought safe now considered potentially dangerous
    - 3. Long-term effects
    - 4. Synergistic effect of chemical interaction

- G. U.N. recommendations

IV. Advertising

- A. Reflect the "mood of the moment"
    - 1. "Pure," "natural," "organic," etc.
    - 2. Additive-free
    - 3. Defense of additives used

- B. "Health food" claims cannot be made on food labels

C. Consumer cautions
   1. Question "y" words
   2. Watch spellings
   3. Notice flavor descriptions
   4. Listen and read carefully
   5. Take nothing for granted
   6. Differentiate between advertising and food labels

V. Governmental role

A. 200 years of U.S. food laws

B. The FDA
   1. Enforcement of food laws
   2. Responsible only for interstate commerce
   3. Cooperative Quality Assurance Program
   4. Agency's State Contract Program
   5. Recall of dangerous products
   6. Consumer complaints

VI. The consumer's role

   A. Discuss

   B. Write government officials and food manufacturers

   C. Listen to and read food advertisements carefully

   D. Routinely read labels

   E. Protest by not using products

Student O

1. Given the term food additive and several descriptive phrases, the student will correctly identify the definition of food additive.

2. Given several phrases, the student will select those which are reasons why food manufacturers use food additives.

3. Given several alternatives, including "natural and man-made," the student will select "natural and man-made" as two of the types of ingredients found in manufactured food.

4. Given a series of statements, the student will select the reason why there is concern over the ever-growing use of food additives.

5. Given several alternatives, including "acids," the student will select "acids" as the additive that is used to intensify flavor.

6. Given several alternatives, including "alkalies," the student will select "alkalies" as the additive that is used to prevent products from becoming too acidic in taste and lengthen shelf life.

Objectives

7. Given several alternatives, including "stabilizers," the student will select "stabilizers" as the additive that keeps solids and liquids from separating.

8. Given several alternatives, including "thickeners," the student will select "thickeners" as the additive that provides consistency and body to food products.

9. Given several alternatives, including "firming agents," the student will select "firming agents" as the additive that keeps fruits and vegetables from getting soft when heated for canning and bottling.

10. Given several alternatives, including "anti-caking agents," the student will select "anti-caking agents" as the additive that keeps powders free-flowing.

11. Given several alternatives, including "emulsifiers," the student will select "emulsifiers" as the additive that keeps the oil from separating from the food.

12. Given several alternatives, including "preservatives," the student will select "preservatives" as the additive that is used to prevent or slow down the spoiling process.

13. The student will select from among several alternatives the biggest problem with using nitrites in foods.

14. Given several alternatives, including "nutrient supplements," the student will select "nutrient supplements" as the additive that is used to replace vitamins and minerals that are lost or destroyed during the processing of food.

15. Given several alternatives, including "sweeteners," the student will select "sweeteners" as the classification for saccharin and cyclamates.

16. Given several alternatives, including "contaminants," the student will select "contaminants" as the additive which is incidentally added to food.

17. Given a series of statements, the student will select the statement which describes an advantage of using food additives.

18. Given a list of alternatives, including "Food and Drug Administration," the student will select "Food and Drug Administration" as the organization set up as a result of Upton Sinclair's book, The Jungle, in 1906.

19. Given a list of alternatives, the student will identify the GRAS list as a list of additives which the FDA says are "Generally Recognized as Safe" even though not all have been scientifically tested and proven safe.

20. Given a list of statements, the student will identify that the Delaney Clause requires that no food additive can be approved if the additive is found to induce cancer when eaten by man or animal.

21. Given a list of statements, the student will identify that cyclamates, saccharin, red dye #2, and sodium nitrite are additives which induce cancer in animals and/or humans.

22. Given a list of alternatives, the student will select the alternative that correctly describes the difference between a food advertisement and a food label.

23. Given several alternatives, including "FDA," the student will select "FDA" as the organization to whom the consumer should report a grievance about a food product.

Introductory Activities

Generalizations	Activities	Resources
There is an ever-increasing use of chemicals in the food we eat.	1. Administer *Eat, Drink, and Be Healthy* test as a Pre-test.	* Test Teacher PAL
	2. Explore students' current understanding of food additives. Ask who uses food additives and why they are important.	* Transparency Master #1 Teacher PAL
	3. Utilize an audio-visual approach to introduce students to the topic of food additives.	= Because We Care (16 mm film - Film Guide #1) Modern Talking Picture Service + A Chemical Feast (16 mm film - Film Guide #2) Benchmark Films + Eat, Drink, and Be Wary (16 mm film - Film Guide #3) Churchill Films + Food: Green Grow the Profits (16 mm film) MacMillan Films + Food: The Story of a Peanut Butter Sandwich (16 mm film - Film Guide #4) Learning Corporation

Generalizations	Activities	Resources
		+ Warning: Eating May Be Hazardous to Your Health (color/sound filmstrip) Current Affairs Films
		= What About Food Additives? (slides/tape) Food and Drug Administration Regional Offices (Check telephone directory)
		+ What Is This Thing Called Food? (16 mm film - Film Guide #5) Films Incorporated
	3. Divide the class into small groups to "brainstorm" foods containing additives.	* Student Activity Sheet #1 Teacher PAL
	4. Ask the students their food preferences to illustrate controversies surrounding food additives.	* Student Activity Sheet #2 Teacher PAL
	5. Discuss the amount of food additives the average American consumes yearly.	* Student PAL, pp. 3-4
	6. Discuss why many more people are not growing their own fruits and vegetables, baking their own bread, and doing their own canning and preserving. Ask a student to research the history of home preservation methods.	+ "Food of Our Fathers" (pamphlet) Institute of Food Technologists
	7. Utilize government and industry publications as a basis for a discussion of food additives	= "Consumer's Guide to Food Additives" (pamphlet) Department of Consumer Affairs, New York

Generalizations	Activities	Resources
		= "Exploring Food Additives" FDA Consumer Reprint #76-2020 = "A Primer on Food Additives" FDA Consumer Reprint #74-2002 = "Some Questions and Answers About Food Additives" FDA Consumer MEMO #74-2056 (pamphlets) Food and Drug Administration = "Food Additives: What They Are/How They Are Used" = "Food Additives: Who Needs Them?" (pamphlets) Manufacturing Chemists Association
	8. List products sold in the supermarkets which may make exaggerated health claims and/or which contain questionable ingredients, either natural or man-made. Discuss the health claims.	
	9. Develop a learning center or small group activity using food illustrations.	+ The Politics of Food (photographs) Documentary Photo Aids
	10. Borrow a supermarket shopping cart and fill it with a variety of foods, including convenience products and "health food" items. Ask students to categorize the products according to whether they have few or many additives.	

Generalizations	Activities	Resources
	11. Suggest that students cut out and display: Food items which are both high and low in food additives. Foods which illustrate the various uses of additives. Examples of food advertising cleverly worded so as to mask the use of food additives.	+ Magazines
	12. Ask students to clip cartoons, jokes, or articles concerned with the use of food additives. Make a bulletin board or collage of the clippings. Add to the display until finished studying this PAL.	+ Magazines, newspapers

Developmental Activities

Activities	Resources
1. Utilize **What are food additives, & why are they in our food?**	* Student PAL, pp. 5-12
2. Discuss the reasons food additives are placed in our food.	* Transparency Master #2 Teacher PAL
3. To illustrate the extensive use of additives, list the ingredients found in some processed foods and ask the students to name the product. Or, ask students to examine several processed foods which are in their homes and list all the ingredients contained on the labels. Have the students read to the class the ingredients of a product for the other students to determine what the product is.	* Student Activity Sheet #3 Teacher PAL
4. Discuss the advantages and disadvantages of doing your own canning, baking, etc. Advantages may include lower cost, higher nutrition, and low amount of additives. Disadvantages could be time involved, possible dangers of food poisoning from incorrect procedures, etc. Discussions could lead to an analysis of the advantages and disadvantages of food additives themselves.	
5. Ask a student or small group of students to research and report to the class on the history of home canning and the development of factory processing methods.	
1. Utilize **What kinds of additives are there?**	* Student PAL, pp. 13-28
2. Introduce the different categories and uses of intentional food additives.	* Transparency Masters #3-7 Teacher PAL

Activities	Resources
3. Discuss incidental additives and how they get into our food.	
4. Demonstrate the psychological effects color has on food preferences by bringing to class foods normally colored and also colored different from their customary colors. Ask students which ones they prefer. Examples could include: Grapefruit juice/grapefruit juice with purple (red and blue) food coloring added. Milk/milk with green or blue food coloring added. Canned green beans/canned green beans with food coloring added. Any food or drink which takes color easily may be substituted or added.	
5. Ask students to bring in their favorite candy or candy bar. Compare their favorites in terms of which contain artificial flavorings and colorings and which do not. Students may summarize the discussion as a written exercise.	
6. Have students collect food labels for a bulletin board display or individual scrapbook collections to display food additive categories.	* Student Activity Sheet #4 Teacher PAL
7. Suggest that students devise food additive card games. Collect ingredient labels on one set of index cards for a matching exercise.	
A second game could be devised using the categories of additives on one set of cards and the names of particular additives (i.e., calcium propionate, BHT, BHA, etc.) on the second set, or devise an activity sheet as a matching exercise.	* Student Activity Sheet #5 Teacher PAL
8. Ask students to analyze the ingredient labels of food products on their family's pantry shelves at home to see which ones contain sugar and/or salt. Use their lists as a basis for a class discussion on the amount of sugar and salt normally used, sometimes unknowingly. Discuss why these substances are added to foods and how they affect the nutritional value and calorie content.	
9. Ask students to make individual lists of the foods to which they normally add sugar or salt. Ask for volunteers to eliminate additional sugar or to restrict salt for three or four days and compare their impressions of how the food tasted on the first day with how it tasted on the last day of the experiment.	

Activities	Resources
10. Conduct classroom experiments to detect the presence of additives in foods.	= Experiments in the Chemistry of Foods Educational Activities Committee Manufacturing Chemists Assn.
11. Ask a science teacher to demonstrate identity tests for synthetic colors in foods.	+ Identity of Artifical Color in Oranges + Identity of Synthetic Colors in Foods FDA Science Project Series, #42 Food and Drug Administration
12. Discuss kinds and amounts of contaminants (filth) which are legally tolerated in food.	+ Jacqueline Verrett Eating May Be Hazardous to Your Health (book) Simon and Schuster * Student Activity Sheet #6 Teacher PAL
13. Cite examples of foods found to be contaminated with high amounts of incidental additives of filth and discuss the actions taken against the products and/or food processors.	+ FDA Consumer (Recent actions printed in the back of each issue.) = "PBB'S: One State's Tragedy" FDA Consumer Reprint #77-6022 (pamphlet) Food and Drug Administration
14. Utilize Food and Drug Administration publications as a basis for a discussion of particular food additives.	= "Additives for Eye Appeal" FDA Consumer Reprint #74-2008 = "Antibiotics and the Foods" You Eat" FDA Consumer MEMO #74-6011 = "BHT and BHA as Food Additives" FDA Consumer MEMO #74-2037

Activities

1. Utilize ***Are food additives safe?***

Resources

= "BHT and BHA as Food Additives"
FDA Fact Sheet #72-2027

= "Countdown on Color Additives"
FDA Consumer Reprint #77-2075

= "Finding Out What ELSE You Eat"
FDA Consumer Reprint #76-2007

= "Food Colors (Color Additives)"
FDA Consumer MEMO #74-2054

= "Keeping Foods Clean"
FDA Consumer Reprint #75-2002

= "Meat Tenderizers and Monosodium Glutamate (MSG)"
FDA Consumer MEMO #74-2043

= "More Than You Ever Thought You Would Know About Food Additives" (Parts I, II, III)
FDA Consumer Reprints #79-2115, #79-2118, #79-2119

= "Nitrates and Nitrites"
FDA Consumer MEMO #76-2067

= "We Want You to Know About Use of Drugs in Animal Feed"
FDA #78-6030

= "We Want You to Know What We Know About Drugs for Food-producing Animals"
FDA #73-6009
(pamphlets)
Food and Drug Administration

* Student PAL, pp. 29-44

Activities	Resources
2. Discuss the statement, "There is a growing worry over the chemicals in our food." Determine who might be concerned--or who ought to be worried. Ask if anyone is concerned about natural toxins in foods.	* Transparency Masters #8,9 Teacher PAL
3. Assign individual student research reports on the most controversial food additives: MSG, cyclamates, nitrates and nitrites, red dye, DES, etc.	
4. Ask a student to illustrate ppm, ppb, and ppt in metric terms.	* Student PAL, p. 33
5. Assign students to research and debate: RESOLVED: FEEDING LARGE DOSES OF AN ADDITIVE TO ANIMALS IN LABORATORY TESTS IS AN EFFECTIVE WAY TO CHECK ITS SAFETY.	* Transparency Master #10 Teacher PAL
6. Assign students to interview community individuals involved with food--such as school or hospital dieticians and supermarket managers--to determine their views on the safety of food additives.	
7. Discuss the fact that some food additives and synthetic ingredients are also used for other purposes. For example, Aldehyde C17, a flavoring used in cherry ice cream, is an inflammable liquid used in anilene dyes, plastic, and rubber.	* Student Activity Sheet #7 Teacher PAL
8. Ask the class to write letters to their congressmen giving their opinions concerning the Delaney Clause.	
9. Invite a public relations representative from the nearest FDA office to speak to the class on the safety of food additives. The class could prepare a list of questions for the representative in advance.	FDA representative
10. Assign students to research and find examples of chemicals which, when combined, have dangerous and/or synergistic effects.	
11. Utilize government, consumer, and industry publications in discussions on the safety of food additives.	+ "Chemical Cookery" + "Chemical Cuisine" (poster) + "Does Everything Cause Cancer" (pamphlets) Center for Science in the Public Interest

Activities

48

Resources

= "Animal Tests and Human Health"
FDA Consumer Reprint #78-1036
+ "Focus on Food Safety"
FDA Consumer April, 1979
= "Food Additives and Hyperactive Children"
FDA Consumer Reprint #77-2280
= "Food Additives: Double Check on Safety"
FDA Consumer Reprint #77-2084
= "Food Ingredient Review: Where It Stands Now"
FDA Consumer Reprint #75-2004
= "The GRAS List Revisited"
FDA Consumer Reprint #78-2103
= "A Greater Margin for Food Safety"
FDA Consumer Reprint #75-2014
= "Natural Poisons in Food"
FDA Consumer Reprint #76-2009
= "Nitrites: Focusing On Safety"
FDA Consumer Reprint #78-2095
= "The Saccharin Ban"
FDA Consumer Reprint #77-2079
(pamphlets)
Food and Drug Administration

+ "Cancer Prevention and the Delaney Clause"
(pamphlet)
Health Research Group

+ "The Effects of Food Processing on Nutritional Values"
+ "Mercury In Food"
+ "Naturally Occuring Toxicants In Foods"
+ "The Risk/Benefit Concept as Applied to Food"
(Scientific Status Summaries)
Institute of Food Technologists

Activities	Resources
1. Utilize ***Food ads & advertising... What is the connection?***	* Student PAL, pp. 45-52
2. Discuss the meanings of "health," "organic," and "natural" when used in food advertisements.	= "The Confusing World of Health Foods" FDA Consumer Reprint #79-2108 (pamphlet) Food and Drug Administration
3. Collect and display ingredients lists from identical products of different brands. Compare prices and advertising for competing products. Discuss the effect of advertising.	
4. Conduct a taste-test. Ask students to differentiate between well-known brands and "house" brands. Also ask students to differentiate between natural and artificially-flavored products.	
5. Invite the manager or salesperson of a local "health-food" store to speak to the class on the advantages of eating natural and/or organic foods. The class could prepare a list of questions in advance.	— Health-food store salesperson
6. Assign students to compare prices of certain foods sold in a supermarket with similar foods sold in a health food store.	
7. Video-tape 30 minutes of TV commercials for classroom analysis of the manner in which advertising influences us to buy foods high in additives and low in nutritional value. Discuss why commercials are rarely seen for such products as fruit and vegetables.	
8. Conduct an "honest labeling" exercise. Display commonly-known products such as frozen "Polynesian Style" TV dinner. Ask that students relabel the product after carefully reading the ingredients. The "Polynesian Style" TV dinner might appropriately be labeled a "Rehydrated Potato Flake Dinner."	

Activities	Resources
9. Discuss words used to describe products that might be misleading to the consumer.	* Student Activity Sheet #8 Teacher PAL
10. Ask students to find advertisements in newspapers or magazines defending the use of additives or proclaiming the product to be "additive-free." Make a collage of the advertisements.	+ Newspapers, magazines
1. Utilize ***What is the government's role?***	* Student PAL, pp. 53-62
2. Suggest that students devise card games utilizing the laws governing the use of food additives. Devise situations involving the use of additives for one set of cards and "law" card for the other set. Ask students to match the situation to the applicable law.	
3. Role-play situations which illustrate the necessity for certain laws governing the use of food additives. A scene from The Jungle might make a good dramatization.	
4. Suggest that students try their hand at drafting legislation. List situations for which there is no applicable law and give the students the responsibility for writing a law to cover the situation.	
5. Organize a letter-writing campaign to congressmen. Suggested topics: Students' opinions on the use of additives in food. Requests for answers to specific questions: Why are nitrates and nitrites still in our food? When will the review of the GRAS list be finished? Why is the Delaney Clause not enforced?	
6. Discuss the ethics of manufacturers investigating the safety of their own product.	

Activities

7. Discuss actions taken by state and federal agencies to ens

8. Cite examples of consumer problems--especially problems re
Discuss ways to solve the problems and any difficulties th
trying to get action on the complaints.

9. Discuss the main points to include in letters written to g
and food manufacturers and concerned with food quality pro

e

	Resources
ure food safety.	+ FDA Consumer (Recent actions printed in the back of each issue) Food and Drug Administration
lating to food. at could arise in	* Student Activity Sheets #9,10 Teacher PAL
overnment agencies blems.	+ "Mini Lessons from FDA" (Teaching lesson plan) Food and Drug Administration

Review Activities

Generalizations	Activities	Resources
The student will review the increasing use of food additives.	1. Debate: **RESOLVED: ALL FOOD ADDITIVES SHOULD BE ELIMINATED FROM FOODS FOR HUMAN CONSUMPTION.** As an alternative, a small group could record a panel discussion on the same topic.	
	2. Ask students to examine school menus for the past week. Indicate those foods which probably contained additives and those which probably did not. Report the findings (perhaps by letter) to the food services director and the local newspaper. Students could collect the large food containers with ingredient labels for documentation.	
	3. Plan a field trip to a local health food store. Devise a student worksheet to be completed at the store. Include comparing or noting types of snack foods available, types of sweeteners sold, flour products available in a health food store and those available at the supermarket, and label-reading activities in which amounts of additives used are noted.	
	4. If a food processing or manufacturing plant is located in your area, ask a company representative to speak to your class and describe the production process, including the use and purpose of food additives in their products.	
	5. Divide students into small groups to write a press release or radio spot announcement on their major conclusions concerning food additives.	* Student Activity Sheet #11 Teacher PAL

Generalizations	Activities	Resources
	6. Ask several students to make "from scratch" foods similar to those sold in fast-food restaurants and then compare them to the fast-food varieties. Notice the differences and similarities. Examples of foods could include milkshakes, onion rings, hamburgers, french fries, fried chicken, pizza, etc.	
	7. Organize a letter-writing campaign to food manufacturers and processors in which students express their opinions about the use of additives in food.	
	8. Discuss the importance of distinguishing between fact and opinion when studying controversial issues such as food additives.	* Student Activity Sheet #12 Teacher PAL
	9. Take a field trip to the closest FDA Testing Laboratory. If this cannot be arranged, ask a FDA representative to speak to the class on the testing of food additives. Students should prepare in advance a list of questions concerning FDA's operations.	
	10. Have students prepare pocket guides to the most frequently used additives. Print in quantity. Guides could be useful to parents, teachers, and other adults, as well as students.	
	11. Review the terms used in the study of food additives.	* Student Activity Sheet #13 Teacher PAL * Student Activity Sheet #14 Teacher PAL * Specialized Vocabulary Teacher PAL

Generalizations	Activities	Resources
	12. Review the student objectives for this module.	* Student Activity Sheet #15 Teacher PAL
	13. Ask the students to express their opinions on the general use of food additives and to determine appropriate goals and actions.	* "Personal Commitment Student PAL, p. 63
	14. Ask the students to determine the responsibilities of consumers, manufacturers, and the government in maintaining a safe food supply.	* "Self-Evaluation" Student PAL, p. 64
	15. Administer *Eat, Drink, and Be Healthy* test as a Post-test.	* Test Teacher PAL

General Resources – Addresses

Benchmark Films
145 Scarborough Rd.
Briar Cliff Manor, NY 10510

Center for Science in the Public Interest
1755 S St. N.W.
Washington, DC 20009

Churchill Films
662 North Robertson Blvd.
Los Angeles, CA 90069

Consumer Information Center
General Services Administration
Pueblo, CO 81009

Current Affairs Films
24 Danbury Rd.
Wilton, CN 06897

Department of Consumer Affairs
City of New York
80 Lafayette St.
New York, NY 10013

Documentary Photo Aids
P.O. Box 956
Mt. Dora, FL 32757

FilmFair Communications
10900 Ventura Blvd.
Studio City, CA 91604

Films Incorporated
1144 Wilmette Avenue
Wilmette, IL 60091

Food and Drug Administration
5600 Fishers Lane
Rockville, MD 20852

Health Research Group
2000 P Street N.W.
Washington, DC 20009

Institute of Food Technologists
221 N. LaSalle St.
Chicago, IL 60601

Learning Corporation
1350 Avenue of the Americas
New York, NY 10019

Macmillan Films
34 MacQuesten Pkwy. S.
Mount Vernon, NY 10550

Manufacturing Chemists Association
1825 Connecticut Ave., N.W.
Washington, DC 20009

Modern Talking Picture Service
5000 Park Street North
St. Petersburg, FL 33709

Nutrition Foundation, Inc.
Office of Education
888 Seventeenth St. N.W.
Washington, DC 20006

Simon and Schuster
Rockefeller Center
630 Fifth Avenue
New York, NY 10020

Superintendent of Documents
Government Printing Office
Washington, DC 20402

U.S. Department of Agriculture
Nutrition Program
Consumer and Food Economics Institution
Agricultural Research Service
Hyattsville, MD 20782

Specialized Vocabulary

ACIDS	Food additives used to intensify the flavor of foods
ADVERTISE	To arouse a desire to buy a product, usually by emphasizing desirable qualities
ALKALIES	Food additives used to neutralize excess acidity
AMENDMENT	A change in the law
ANTI-CAKING AGENTS	Food additives used to keep powders, salts, and sugar free-flowing
ANTIOXIDANTS	Food preservatives used to prevent undesirable changes in color or flavor caused by oxidation
BAN	Prohibit the use
BLEACHING AGENTS	Food additives used to whiten foods, such as flour or certain cheeses
BOTULISM	Acute food poisoning; can cause death
CARCINOGEN	A cancer-causing substance
COLORINGS	Food additives used to improve a food's normal appearance by changing the color
CON	An argument against something or someone

C4

C5

CONTAMINANTS	Undesirable substances that may enter food
CURING AGENTS	Food additives used to preserve meat
DELANEY CLAUSE	Part of the 1958 Food Additives Amendment; named after a New York congressman, the clause states that any additive which is found to induce cancer when ingested by man or animal may not be used in food for humans in any amount at all
EMULSIFIERS	Food additives which help combine ingredients which normally don't mix well together
ENRICH	Add specific nutrients to a food as established in a federal standard of identity and quantity (for example: enriched bread); amounts added generally are moderate and include those commonly present at even lower levels
FIRMING AGENTS	Food additives which keep fruits and vegetables from becoming soft while being processed
FLAVORING AGENTS	Food additives used to enhance the natural flavor of foods
FLAVORS	Food additives used to add distinctive tastes to foods
FOAMING AGENTS	Food additives used to control the foaming, or whipping, qualities of foods
FOOD	Articles used for food or drink for humans or other animals, chewing gum, and articles used for components of any such article

FOOD ADDITIVE	Substance added directly to food or which may reasonably be expected to become a component of food through surface contact with equipment or packaging materials
FOOD ADDITIVES AMENDMENT	Prohibits the use of new food additives until sponsor establishes safety and FDA issues regulations specifying the conditions of use
F.D.A.	The Food and Drug Administration; federal agency under the Department of Health, Education, and Welfare which is responsible for the enforcement of the Federal Food, Drug and Cosmetic Act
FORTIFY	Add to foods specific nutrients; amounts added are usually in excess of those found normally in the food because of the importance of providing additional amounts of the nutrients to the diet
GRAS LIST	The FDA's list of substances Generally Recognized As Safe; excluded from the provisions in the Food Additives Amendment
HEALTH FOODS	Foods which are claimed to have special virtures in preventing, treating, and curing disease or providing superior health; such claims are not permitted on food labels
HUMECTANTS	Food additives used to keep moisture in certain foods
INCIDENTAL ADDITIVES	Food additives which may be present in the finished food in trace quantities as a result of production, processing, storage, or packaging
INHIBITORS	Food preservatives which delay or prevent the growth of mold, bacteria, or yeast which spoil food
INTENTIONAL ADDITIVES	Food additives purposely added to perform specific functions

INTERSTATE	Between two or more states
LEAVENING AGENTS	Food additives used to lighten the texture of certain foods, such as baked goods
MATURING AGENTS	Food additives used to age flour and improve the baking qualities
NATURAL FOODS	Foods in the same form as when they were harvested--raw, uncooked; can also refer to products marketed without preservatives, emulsifiers, or artificial ingredients
NUTRIENT	One of the more than 50 known elements of food which promotes body growth and development and regulates body processes
NUTRIENT SUPPLEMENTS	Food additives used to increase food value
ORGANIC FOODS	Foods grown without the use of chemical fertilizers or pesticides
PPM	Parts per million; a unit for measuring the presence of additives in food
PRESERVATIVES	Food additives which extend the life of food
PRO	An argument for, or in favor of, something or someone
PROCESSED FOODS	Foods no longer in the same form as when they were harvested
RANCID	Having a rank smell or taste
RECALL	A food manufacturer or processor "takes back" food that has already been distributed to food stores

SEQUESTRANTS	Food preservatives used to separate traces of substances which might interfere in the processing
SOLVENTS	Food additives used as carriers for other additives or ingredients
STABILIZERS	Food additives which keep solids and liquids from separating
SWEETENERS	Food additives used to give a sweet taste to foods
SYNERGISTIC	Refers to the cooperative action of substances, which, when combined, have a total effect which is greater than the sum of the effects taken separately
THICKENERS	Food additives used to provide consistency and "body" to many foods
TOXIN	Poison

Film Descriptions

BECAUSE WE CARE (20 minutes) - Modern Talking Picture Service FILM GUIDE #1

Produced by Oscar Mayer and Co., this film describes the history and present operations of the nation's sixth largest meat processing firm. It details the many steps involved at the company's modern and efficient facilities to bring tasty, quality meat products conveniently packaged as sausage, bacon and sliced luncheon meats to the retail grocery store.

CHEMICAL FEAST (A) (11 minutes) - Benchmark, 1973

In chef's clothes and surrounded by an array of chemicals and modified foods, the comedian Marshall Ephron, in his memorable satire, merrily concocts a supermarket synthetic "lemon pie" using the ingredients listed on its label. Then, Ephron takes four known brand food products, notes their chemical additives, non-nourishing or harmful ingredients, and calculates their exorbitant price by the pound.

EAT, DRINK AND BE WARY (21 minutes) - Churchill, 1974 FILM GUIDE #2

This film is a critical examination of our eating habits, nutritional losses in food processing, food additives, and the role of food manufacturers in changing our diets.

FOOD: GREEN GROW THE PROFITS (56 minutes) - Macmillan

Where does America's food come from, and why doesn't it taste the way it used to? This hard-hitting ABC News documentary reveals that growing, processing and marketing of many foods in the U.S. is no longer a family affair, but big business . . . agribusiness. The major effects of agribusiness impact in three areas: machines help or replace workers; penned animals are fed chemically enriched feed that accelerates growth; pesticides and preservatives are used heavily.

FOOD: THE STORY OF A PEANUT BUTTER SANDWICH (13 minutes) - Learning Corp. of America, 1971 FILM GUIDE #4

The popularity of the humble peanut butter sandwich leads to an inquiry into food processing, its mechanics and economics. A group of school children have devised a contest for themselves -- whoever makes the most unusual sandwich combination will be the winner -- provided the concoction is also edible! With the film-maker-as-uninvited-guest posing questions to the children, and a comic early-film-style sequence filling in some historical blanks, the story of peanut butter from field to supermarket shelves is detailed. Manufacture, marketing, geographic and cultural factors, and those inexplicable human preferences are all considered. The success story of peanut butter is dramatized through interviews with the man on the street, as well as factory scenes and animation sequences.

THE HEALTH FOOD MOVEMENT (16½ minutes) - FilmFair Communications, 1973 FILM GUIDE #6

The increasing interest in organically grown and unprocessed foods is seen as a reaction to first, the possible pollution of foodstuffs by use of agricultural chemicals, and second, to the values of what is seen as an over-consuming and over-refined society. The movement's basic terms are defined (e.g., organically grown, "food that comes from soil that has not been treated by chemical fertilizers, chemically sprayed or fumigated, or refined after harvest"). Then the activities of three typical health food advocates are used to explain details of the movement: an organic farmer, a manager of a health foods store, and a young family who eat mainly "natural" foods. The young mother, who represents the consumer in the chain, summarizes her family's interest thus: "It's not that we're turning back the clock to Grandma's day -- we're just discarding the unnecessary and finding real values in our whole way of life."

WHAT IS THIS THING CALLED FOOD? (52 minutes) - Films Incorporated, 1976 FILM GUIDE #5

In a mere thirty years or so the number of chemicals used directly or indirectly in our food supply has increased from only a few dozen to almost six thousand. The new food technology has for the most part served the consumer well -- in preserving foods, in cutting costs, in offering convenience, and even in creating new food supplies. But there is growing concern among scientists as to the possible effects on the human body. They are asking questions: What is the long-term damage to our health and to the health of our children? Are the safety tests required of new products adequate? Responsible representatives of the scientific community, industry and government examine the evidence new at hand to determine what, if anything, can be done to safeguard the health of future generations.

INSTRUCTIONAL AIDS

CLASSROOM TEACHERS ARE AUTHORIZED TO REPRODUCE THIS ORIGINAL COPY FOR USE IN THEIR CLASSROOMS.

Eat, Drink, & Be Healthy

CHOOSE THE BEST ANSWER FOR EACH STATEMENT OR QUESTION.

1. Food additives are
    - A. foods which are completely produced in food factories.
    - B. natural or man-made substances which are added directly to food for a specific purpose or become part of the food indirectly during production, processing, storage, or packaging.
    - C. factory processed foods which eliminate the need for much home preparation.
    - D. 700 substances which the FDA has shown to cause cancer in humans and/or animals.

2. One reason food manufacturers use food additives is to
    - A. produce convenience foods.
    - B. lower the processing profit margins.
    - C. make the processing time longer.
    - D. increase quantity and decrease quality.

3. What are two of the types of ingredients usually found in manufactured food?
    - A. Natural and man-made
    - B. Nitrates and nitrites
    - C. Calories and carbohydrates
    - D. Vitamins and trace minerals

4. Some people express concern over the ever-growing use of additives in food because
    - A. the price of food is increasing from the high cost of additives.
    - B. the chemicals are harmful if they are not washed or cooked off.
    - C. the long-range effects of eating additives are not known.
    - D. they reduce the nutritional value of the food product.

5. Which of the additives below is used to intensify the flavor of some foods?
   A. Acids
   B. Humectants
   C. Preservatives
   D. Contaminants

6. To reduce the acidity of its frozen coconut cream pie, a frozen food company added ammonium bicarbonate. This acid-reducing additive is classified as
   A. a preservative.
   B. an emulsifier.
   C. a stabilizer.
   D. an alkali.

7. Board's Dairy uses an additive in its chocolate milk to keep the chocolate from settling to the bottom of the container. This additive which keeps solids and liquids from separating is a
   A. solvent.
   B. thickener.
   C. stabilizer.
   D. firming agent.

8. Board's Dairy uses gum arabic in its cheese spreads to provide consistency and body. This type of additive is classified as
   A. an alkali.
   B. a thickener.
   C. a curing agent.
   D. a preservative.

9. Which of the additives below is used to keep some fruits and vegetables from getting soft when heated for canning and bottling?
   A. Emulsifiers
   B. Stabilizers
   C. Preservatives
   D. Firming agents

10. The additives used to keep salt and sugar free-flowing are
    A. anticaking agents.
    B. sequestrants.
    C. emulsifiers.
    D. alkalies.

11. The additive that Board's Dairy puts in margarine to keep the ingredients from separating is
    - A. an acid.
    - B. a thickener.
    - C. an emulsifier.
    - D. an anticaking agent.

12. The Better Baking Company adds calcium propionate to its bread to help prevent mold growth and spoilage. This type of additive is classified as
    - A. an acid.
    - B. an alkali.
    - C. a contaminant.
    - D. a preservative.

13. The biggest problem with using nitrites in food is that they
    - A. are extremely expensive to use.
    - B. may combine with other chemicals in the food to form a cancer-causing substance.
    - C. prevent the growth of healthy botulism bacteria.
    - D. make food turn an odd color, so coloring needs to be added, too.

14. Merry Milk Company added Vitamin D to its milk. This type of additive is called a
    - A. nutrient supplement.
    - B. thickener.
    - C. sweetener.
    - D. flavoring.

15. Saccharin and cyclamates are both classified as
    - A. nutrients.
    - B. flavorings.
    - C. sweeteners.
    - D. contaminants.

16. When Terrific Tuna Products were found to contain high levels of chemicals caused from fish exposure to water pollutants, these incidental additives were classified as
    - A. contaminants.
    - B. flavorings.
    - C. nutrients.
    - D. alkalies.

17. Which statement describes an advantage of food additives?
    A. All food additives add nutritional value to food.
    B. Because of food additives many foods do not spoil as quickly as they once did.
    C. All food additives have been thoroughly tested by the FDA and shown to be absolutely safe for human consumption.
    D. Such small amounts of food additives are used that they are guaranteed to be harmless in our food.

18. In 1906, The Jungle, by Upton Sinclair, was able to disgust Americans so much with its descriptions of filthy meat packing plants that the following organization was set up:
    A. Health, Education, and Welfare Department
    B. Federal Department of Agriculture
    C. Food and Drug Administration
    D. Consumer Protection Agency

19. The GRAS list is a list of approximately 700 additives
    A. of which not all have been scientifically tested and proven safe.
    B. of which all have been shown to produce cancer in animals and/or humans.
    C. which the FDA required proof of safety from food manufacturers before approving them for human consumption.
    D. which the FDA says are generally recognized as suspect and should not be used for human consumption.

20. There is a law which says that no food additive can be approved if it is found to induce cancer when eaten by man or animal. The name of this law is The
    A. Consumer Advocate Policy.
    B. Food Science Regulation.
    C. Carcinogenic Law.
    D. Delaney Clause.

21. Cyclamates, Saccharin, Red Dye #2, and Sodium Nitrite are additives that
    A. are usually combined together in processed food.
    B. have been shown to induce cancer in test animals.
    C. have been shown to cause death by poisoning.
    D. are necessary to insure the flavor of cake mixes.

22. The difference between food advertisements and food labels is that the
    A. advertisements are required by law.
    B. labels tell you how the food product tastes.
    C. labels tell you exactly what is in the product.
    D. advertisements tell you exactly what is in the product.

23. Barbara was upset to find that the can of tomatoes she was planning to fix for dinner had mold growing in it. She should report her problem quickly to the
    A. PSC.
    B. FDC.
    C. FCC.
    D. FDA.

NAME ____________________

CLASS ____________________

DATE ____________________

Eat, Drink, & Be Healthy

1 Ⓐ Ⓑ Ⓒ Ⓓ
2 Ⓐ Ⓑ Ⓒ Ⓓ
3 Ⓐ Ⓑ Ⓒ Ⓓ
4 Ⓐ Ⓑ Ⓒ Ⓓ
5 Ⓐ Ⓑ Ⓒ Ⓓ
6 Ⓐ Ⓑ Ⓒ Ⓓ
7 Ⓐ Ⓑ Ⓒ Ⓓ
8 Ⓐ Ⓑ Ⓒ Ⓓ
9 Ⓐ Ⓑ Ⓒ Ⓓ
10 Ⓐ Ⓑ Ⓒ Ⓓ
11 Ⓐ Ⓑ Ⓒ Ⓓ
12 Ⓐ Ⓑ Ⓒ Ⓓ
13 Ⓐ Ⓑ Ⓒ Ⓓ
14 Ⓐ Ⓑ Ⓒ Ⓓ
15 Ⓐ Ⓑ Ⓒ Ⓓ
16 Ⓐ Ⓑ Ⓒ Ⓓ
17 Ⓐ Ⓑ Ⓒ Ⓓ
18 Ⓐ Ⓑ Ⓒ Ⓓ
19 Ⓐ Ⓑ Ⓒ Ⓓ
20 Ⓐ Ⓑ Ⓒ Ⓓ
21 Ⓐ Ⓑ Ⓒ Ⓓ
22 Ⓐ Ⓑ Ⓒ Ⓓ
23 Ⓐ Ⓑ Ⓒ Ⓓ

Brainstorming

WE ALL KNOW THAT MUCH OF OUR FOOD IS PROCESSED IN MODERN AMERICA. WE HAVE COME TO EXPECT IT, OFTEN ENJOY IT, AND SOMETIMES WORRY A BIT ABOUT IT. LET'S SEE HOW OBSERVANT YOU HAVE BEEN.

DIVIDE INTO GROUPS OF THREE OR FOUR AND BRAINSTORM. THINK OF ALL OF THE FOODS WHICH YOU EAT WHICH HAVE ADDITIVES. YOU WILL HAVE TEN MINUTES TO DO THIS. BUT, IF YOU HAVEN'T BRAINSTORMED BEFORE, FOLLOW THE RULES BELOW.

BRAIN-STORM-ING: n. A means to get many imaginative ideas and solutions to problems, from small groups of persons.

Brainstorming is a group problem-solving activity. The rules are simple: no negatives! The object is to get as many ideas as possible out on the table -- the weeding out and refining will come later.

In simple steps, here's how to run a brainstorming session:

A. Spell out the problem your group is going to tackle. The more specific the question, the more specific will be the suggestions.

B. Get together in a comfortable setting. Somebody should be a recorder for the group. Use newsprint and magic markers.

C. Size? Probably the best with a small group -- enough people to get ideas, but not so many that you wind up with more voices making more noise than you can handle.

D. Set a time limit and allow only new ideas, fresh approaches, and positive statements to be offered.

E. Turn it loose! The leader should start it off with a few ideas and then encourage others to jump in with whatever comes to mind.

What's your preference?

1. Do you ever want foods you can prepare quickly and easily?
   ☐ yes ☐ no

2. Do you like being able to select local "home-grown" fruits and vegetables as well as foods grown in other parts of the country?
   ☐ yes ☐ no

3. Do you want nutrients which are lost during processing returned to the food?
   ☐ yes ☐ no

4. Do you want to eat residues of chemicals such as pesticides or industrial pollutants along with your food?
   ☐ yes ☐ no

5. Do you like your cake batters to rise high and light during baking?
   ☐ yes ☐ no

6. Do you want chemicals that have been shown to cause cancer in animals added to your foods?
   ☐ yes ☐ no

7. Do you like your salt to pour easily from the shaker -- even in humid weather?
   ☐ yes ☐ no

8. Do you like peanut butter that doesn't separate?
   ☐ yes ☐ no

9. Do you want the government to ban chemicals that would do away with American favorites such as the hot dog because there may be a health risk involved?
   ☐ yes ☐ no

10. Do you want bread to stay mold-free as long as possible?
    ☐ yes ☐ no

11. Do you feel it is the government's duty to protect us from unsafe food?
    ☐ yes ☐ no

12. Do you prefer firm rather than mushy canned tomatoes?
    ☐ yes ☐ no

Each of the above questions refers to some aspect of food additives--their uses, benefits, safety questions, or regulations. Look over your answers. Do you see why there may be controversies over the use of additives in our foods today?

Student Activity Sheet #2
Food Additives

QUIZ

FOOD PACKAGES MUST SHOW THEIR INGREDIENTS ACCORDING TO AMOUNTS; THE FIRST INGREDIENT IS PRESENT IN THE GREATEST QUANTITY, AND SO ON THROUGH THE LIST. THE INGREDIENTS LISTED BELOW ARE EXACTLY AS THEY APPEAR ON FOOD PACKAGES. MATCH THE PRODUCT TO THE INGREDIENT LISTING:

_____ 1. Sugar, enriched flour (bleached), shortening (with freshness preserved by BHA and BHT), nonfat dry milk, propylene glycol monoesters and mono and diglycerides, leavening, wheat starch, dried corn syrup, salt, corn cereal, artificial flavor, guar gum, soy lecithin, dried egg whites, cherry fruit and extract, sodium lauryl sulfate, artificial color.

_____ 2. Water, coconut and vegetable oil, sucrose, dextrose, sodium caseinate, vegetable protein, polysorbate 60, sorbitan monostearate, carrageenan, guar gum, vanilla artificial flavor and color.

_____ 3. Corn syrup solids, partially hydrogenated vegetable oil (may contain one or more of the following oils: coconut, cottonseed, palm, palm kernel, safflower, or soybean), sodium caseinate, mono- and diglycerides, dipotassium phosphate, artificial flavor, and artificial colors.

_____ 4. Liquid corn oil, partially hydrogenated corn oil, water, salt, nonfat dry milk, vegetable lecithin, vegetable mono and diglycerides, sodium benzoate as a preservative, artificially colored, artifically flavored, vitamin A palmitate added.

_____ 5. Sugar and dextrose, gelatin, fumaric and malic acids, sodium citrate, salt, artificial flavor and color, vitamin C.

_____ 6. Sugar, citric acid (for tartness), calcium phosphates, (regulate tartness and prevent caking), modified starches (provide body), potassium citrate (regulates tartness), cellulose gum (vegetable gum--provides body), natural orange flavor, vitamin C, hydrogenated coconut oil, artificial flavor, artificial color, vitamin A palmitate, BHA (a preservative).

_____ 7. Hydrolyzed plant protein, salt, corn starch, hydrogenated vegetable oil, sugar, autolyzed yeast, caramel coloring, onion powder, beef extract, disodium inosinate, disodium guanylate, garlic powder, spice and natural flavor.

_____ 8. Carbonated water, caramel color, phosphoric acid, sodium saccharin, sodium citrate, caffeine, natural flavorings and citric acid.

A. Raspberry Gelatin Dessert

B. Beef Bouillon Cubes

C. Diet Cola Soft Drink

D. Cherry Chip Cake Mix

E. Non-dairy Whipped Topping

F. Margarine

G. Instant Breakfast Drink

H. Non-dairy Coffee Creamer

YOUR ADDITIVE KEY

KIND	REASON FOR USE	INGREDIENT
ACIDS AND ALKALIES	ACIDS INTENSIFY FLAVOR OF FRUITS ADD TEXTURE & TARTNESS TO CHEESE PRODUCTS	CITRIC ACID OTHERS ENDING IN "-IC"
	ALKALIES KEEP FOODS FROM BEING TOO ACIDIC IMPROVE FLAVOR AND LENGTHEN SHELF-LIFE USED AS LEAVENING AGENTS (COMMONLY FOUND IN WINES, CANNED PEAS, AND BAKED GOODS)	AMMONIUM BICARBONATE SODIUM CARBONATE CALCIUM CARBONATE
STABILIZERS AND THICKENERS	ADD TEXTURE, UNIFORM COLOR, AND FLAVOR (COMMONLY FOUND IN LIMITED LINE OF PRODUCTS: ICE CREAM AND FROZEN DESSERTS, CONFECTIONERS, CHOCOLATE MILK, AND DRINKS) (3 BASIC TYPES: PURE PLANT EXTRACTS, CHEMICALLY MODIFIED NATURAL PRODUCTS, SYNTHETICS)	CARRAGEENAN VEGETABLE GUMS, GELATIN TRAGACANTH
NUTRIENT SUPPLEMENTS	IMPROVE NUTRITIVE VALUE OF FOODS REPLACE NUTRIENTS LOST IN PROCESSING	VITAMINS MINERALS
FLAVORS AND FLAVORING AGENTS	ACT AS SEASONINGS FLAVOR ENHANCERS BRING OUT NATURAL FLAVOR IN MEATS, SOUPS, AND GRAVIES	"ESSENTIAL OILS" SYNTHETIC FLAVORINGS MSG
BLEACHING AND MATURING AGENTS	WHITEN FLOUR IMPROVE BAKING QUALITIES ALSO WHITENS SOME CHEESE AND NEUTRALIZES COLOR IN FATS AND OILS	NITROGEN OXIDES CHLORINE NITROSYL CHLORIDE
COLORINGS	ADD EYE APPEAL (CANNOT CONCEAL DAMAGED OR INFERIOR PRODUCTS)	SYNTHETIC FOOD COLORINGS
PRESERVATIVES	KEEP FOODS EDIBLE LONGER COUNTERACT SPOILAGE ORGANISMS	
	ANTIOXIDANTS PREVENT OR RETARD FATTY FOOD RANCIDITY AND PREVENT CARBOHYDRATE DISCOLORATION	NATURAL ASCORBIC ACID BHA AND BHT
	SEQUESTRANTS RENDER METAL TRACE ELEMENTS INACTIVE AND PREVENT CLOUDING IN SOFT DRINKS	NATURAL CITRIC ACID
	INHIBITORS PREVENT MOLD GROWTH KILL SPORES WHICH FORM IN FOOD	CALCIUM AND SODIUM PROPIONATE SORBIC ACID BENZOIC ACID
EMULSIFIERS	PREVENT LIQUIDS FROM SEPARATING IMPROVE BREAD CHARACTERISTICS (COMMON IN LIMITED LINE OF PRODUCTS: ICE CREAM AND CONFECTIONERIES, BAKERY ITEMS, MARGARINE, PEANUT BUTTER)	NATURAL LECITHIN MONOGLYCERIDES DIGLYCERIDES
SWEETENERS	ADD SWEETNESS TO FOODS	SUGAR(100 CHEMICAL SUBSTANCES) CORN SYRUP SACCHARIN
FIRMING AND ANTI-CAKING AGENTS	KEEP CANNED VEGETABLES AND FRUITS FROM OVER-SOFTENING KEEP SALT, SUGARS, AND POWDERS FREE-FLOWING	CALCIUM SALTS CORN STARCH CALCIUM STEARATE SODIUM SILICO ALUMINATE
HUMECTANTS	KEEP MOISTURE IN FOODS	PROPYLENE GLYCOL GLYCERINE
CURING AGENTS	INHIBIT GROWTH OF BOTULISM GERMS CHARACTERISTIC PINK COLOR	SODIUM NITRITE SODIUM NITRATE
FOAMING AGENTS	GIVE WHIPPING QUALITIES INHIBITORS PREVENT UNWANTED FOAMING	NITROUS OXIDE MONO- OR DIGLYCERIDES
SOLVENTS	CARRIERS FOR OTHER ADDITIVES OR INGREDIENTS	PROPYLENE GLYCOL

Student Activity Sheet #4
Food Additives

ACACIA, ACETAL, ACETALDEHYDE PHENETHYL PROPYL ACETAL PEPITAL, ACETANISOLE, AGAR-AGAR, ALKANET ROOT

Intentional Additives

MATCH BY PLACING THE LETTER OF THE CORRECT TYPE OF ADDITIVE ON THE BLANK. (SOME MAY HAVE MORE THAN ONE CORRECT ANSWER.)

ADDITIVES

_____ 1. Vanillin
_____ 2. Calcium Phosphate
_____ 3. Phosphoric
_____ 4. Garlic
_____ 5. BHA
_____ 6. Calcium Propionate
_____ 7. Ascorbic Acid
_____ 8. Saccharin
_____ 9. Carotene
_____10. Vitamin D
_____11. Gum Arabic
_____12. Tartaric
_____13. Lecithin
_____14. Red Dye #40
_____15. Citric Acid
_____16. Packaging Particles
_____17. Calcium Stearate
_____18. Carrageenan
_____19. Ammonium Bicarbonate
_____20. Diglycerides
_____21. MSG
_____22. Chlorine Dioxide
_____23. Sucrose
_____24. Gelatin
_____25. Calcium Salts

TYPES OF ADDITIVES

A. Acids
B. Alkalies
C. Stabilizers
D. Thickeners
E. Firming Agents
F. Anti-caking Agents
G. Emulsifiers
H. Humectants
I. Nutrient Supplements
J. Preservatives
K. Flavors and Flavoring Agents
L. Colorings
M. Sweeteners
N. Contaminants
O. Bleaching and Maturing Agents
P. Foaming Inhibitors

88

43

CARRAGE[illegible]NAN CHONDRUS EXTRACT, CARVACRYL ETHYL ET[illegible]R, CINNAMYL BUTYRATE, DEXTROSE, CUMINALD[illegible]YDE

Keeping Foods Clean

HERE ARE A FEW EXAMPLES OF THE LEVELS OF NATURAL CONTAMINANTS (INSECTS, MOLDS, ETC.) THAT IF FOUND IN FOOD CAN CAUSE THE FDA TO TAKE LEGAL ACTION TO REMOVE THE FOOD FROM THE MARKET.

Fresh and frozen fish	1) If 5% by count of fish or fillets in a sample of at least five have a definite odor of decomposition over 25% of their areas 2) If 20% of the fish or fillets in a sample of at least five have a slight odor of decomposition over 25% of their areas
Cornmeal:	1) Average of one whole insect (or equivalent) per 50 gm 2) Average of 25 insect fragments per 25 gm 3) Average of one rodent hair per 26 gm 4) Average of one excreta fragment per 50 gm
Peaches (canned)	1) Average of 5% wormy or moldy fruit by count 2) Average of 4% if a whole larva or equivalent is found in 20% of the cans
Pineapple (canned)	1) Microscopic mold-count average of 30%
Wheat	1) One rodent pellet per pint 2) 1% by weight of insect-damaged kernels
Peanut Butter	1) Average of 50 insect fragments per 100 gm 2) Average of 2 rodent hairs per 100 gm 3) Gritty to the taste and the water-insoluble inorganic residue is 35 mg per 100 gm
Broccoli (frozen)	1) Average of 80 aphids or thrips per 100 gm
Greens (canned)	1) Average of 10% of leaves by count, or weight, showing mildew 1/2 in. in diameter
Tomato Catsup	1) Microscopic mold-count average of 30%
Pizza Sauce	1) Miscroscopic mold-count average of 30%
Tomato Paste or Sauce	1) 30 Drosophila fly eggs per 100 gm 2) 15 Drosophila fly eggs and 1 larva per 100 gm 3) 2 larvae per 100 gm

WHEN A FOOD REACHES THE DEFECT ACTION LEVEL, THE FDA TAKES REGULATORY ACTION TO REMOVE THE CONTAMINATED PRODUCT FROM THE MARKET. AS TECHNOLOGY ADVANCES, THESE "ACTION" LEVELS ARE UPDATED TO REFLECT EXISTING KNOWLEDGE AND PRACTICES.

Contamination levels for these and other foods are listed by Jacqueline Verrett in Eating May Be Hazardous to your Health: The Case Against Food Additives, Simon and Schuster, 1974.

4489

Student Activity Sheet #6
Food Additives

Additives — used for other purposes

SOME ADDITIVES ARE USED OUTSIDE OF THE FOOD INDUSTRY. BELOW IS A LISTING OF A FEW OF THESE ADDITIVES, THEIR PURPOSES IN FOOD, AND OTHER USES. (These examples were taken from A Consumer's Dictionary of Food Additives by Ruth Winter. You may wish to consult this book for more examples.)

ADDITIVE	PURPOSE IN FOOD	OTHER USES
ACETALDEHYDE	Artificial flavoring	Used in manufacture of synthetic rubber, plastics, and for silvering mirrors
ALGINIC ACID	Stabilizer in frozen desserts	Used as binder for briquettes
ALUMINUM HYDROXIDE	Alkali used as a leavening agent in baked goods	Used in antiperspirants
BIRCH	Flavoring agent	Used for preserving leather and wood
BUTYRALDEHYDE	Artificial nut flavoring	Common ingredient of rubber cement
DEXTRIN	Foam stabilizer for beer	Used in matches, fireworks, and explosives
DIOCTYL SODIUM SULFOSUCCINATE	Helps powders dissolve	Used in sugar refining, washing bottles, and cleaning fruits and vegetables
ETHYL ACETATE	Artificial flavoring	Used in industrial solvents, varnishes, and artificial leather
PIPERINE	Synthetic brandy flavoring agent	Insecticide
YLANG-YLANG OIL	Yellow essential oil used in some flavorings	Used in perfumes, cosmetics, and soap

What's In a Name?

WISE CONSUMERS KNOW THAT SOMETIMES A LABEL CAN BE MISLEADING! PRODUCTS ARE DESCRIBED WITH DELICIOUS-SOUNDING TERMS THAT MAY MAKE THE CONSUMER HUNGRY ENOUGH TO BUY THE PRODUCT WITHOUT FULLY REALIZING EXACTLY WHAT IS GOING INTO HIS STOMACH.

ANALYZE THE FOLLOWING TERMS CAREFULLY FOR DECEPTIVE ADVERTISING TECHNIQUES AND WRITE YOUR ANSWERS UNDER EACH DESCRIPTION.

FROOT LOOPS
with other natural flavors

CREME FINGERS

CHEEZ DOODLES

CRUNCH BERRIES
imitation berries

JEL-CREME DESSERT ROLLS

TASTES LIKE CHEESE

96% FAT FREE

BUTTERY

VINE GROWN TOMATOES

MADE RICH AND CREAMY ...

VANILLA-FLAVORED ICE CREAM

BUTTERY GOLDEN CAKE WITH THE RICH CHOCOLATEY FROSTING

Student Activity Sheet #8
Food Additives

CLIP A PROBLEM!

BRING TO CLASS A CLIPPING FROM THE LOCAL NEWSPAPER, REPORTING ON A CONSUMER PROBLEM. WHAT IS THE PROBLEM?

FILL IN THE FOLLOWING FORM. FIRST, PUT IN YOUR GOAL (OR THE GOAL OF THE CONSUMER WITH THE COMPLAINT). THEN, LIST THE THINGS SHE HAS GOING FOR HER -- THE FORCES HELPING HER TO ACHIEVE HER GOAL. NEXT, FILL IN THE OPPOSITE OF HER GOAL -- THE FORCES OPERATING AGAINST HER.

YOUR GOAL	THE OPPOSITE OF YOUR GOAL
	←
FORCES BLOCKING OR DRIVING AGAINST THE ACHIEVEMENT OF YOUR GOAL →	FORCES SUPPORTING THE ACHIEVEMENT OF YOUR GOAL

GIVEN YOUR ASSESSMENT OF THE FORCES, WHAT ARE HER CHANCES OF SUCCESS -- OF ACHIEVING HER GOAL?

LEVELS OF ACTION

Let's assume that you have a food quality problem. You found some hair in your gallon of milk. A canned ham was spoiled. Your pound of hot dogs did not weigh a pound.

WRITE OUT A SAMPLE FOOD QUALITY PROBLEM: ____________________

____

____

Tell what action (if any) you could take on each of the following LEVELS for your problem:

INTERPERSONAL LEVEL:

Example: Go chat with the manager of the store where you bought the food.

INTERGROUP LEVEL:

Example: Join a local consumer group and work with them. Report to the FDA in a formal complaint.

SOCIAL SYSTEM LEVEL:

Example: Get government to pass a law or a new set of rules regarding your type of problem.

PRESS RELEASE

Considering all you have learned about food additives to this point in the PAL, you may be ready to let the world in on your discoveries. Why not write a press release or a radio spot announcement on some of your major conclusions.

You might release them to the morning P.A. announcements in school, or to the school newspaper. You might go public -- release them to papers and stations in your community.

If you have never done this before -- some guidelines appear below:

* * *

PRESS RE-LEASE: n. A brief announcement, a handout, directed to the print media (newspapers, etc.) and/or to the electronic media (radio, TV)

Effective public relations can mean the difference between success or failure for an action group. Unless the public knows about you and your programs, you will have little chance for broad-based community support. You should seek every opportunity to tell "your story," but be sure you have a story to tell. Tell it successfully!

Keep in mind:

A. The news media is in the business to print or broadcast news of local importance. Media people want to know what you are doing.

B. Media have deadlines. Find out what they are and observe them. If you are having a program, plan to contact them several months ahead of time.

C. Get to know at least two good working media persons personally. Call them for advice when you need it.

D. Work up a contact list of newspapers and radio and television stations in your area. It should include names, addresses, and phone numbers of key reporters, broadcasters, and news editors.

E. Get to know the whole range of media outlets available to you.
   1. Newspapers (press releases, letters-to-editor)
   2. Radio (news releases, written public service spots, call-in programs)
   3. Television (news releases, public service spots)
   4. Also consider magazines, local plant and industry publications, outdoor advertising, free shopping news, direct mail, posters, handbills, community bulletin boards, announcements at churches, community organization meetings, displays at shopping centers, community events, and public speaking to civic organizations.

F. Tips about press releases:
-Use 8½" x 11" plain white paper typed neatly on one side. Photocopies are okay; carbons are not (they smear). Double space with 1½" margins.
-Type your organization's name at the top of each page and the name, address, and phone number of person to contact for more information.
-Type the release date in the upper right hand corner--if for release as soon as possible, type "For Immediate Release."
-Stick to facts. Answer "who, what, where, when, and why" in the first sentence or two.

(continued on page 2)

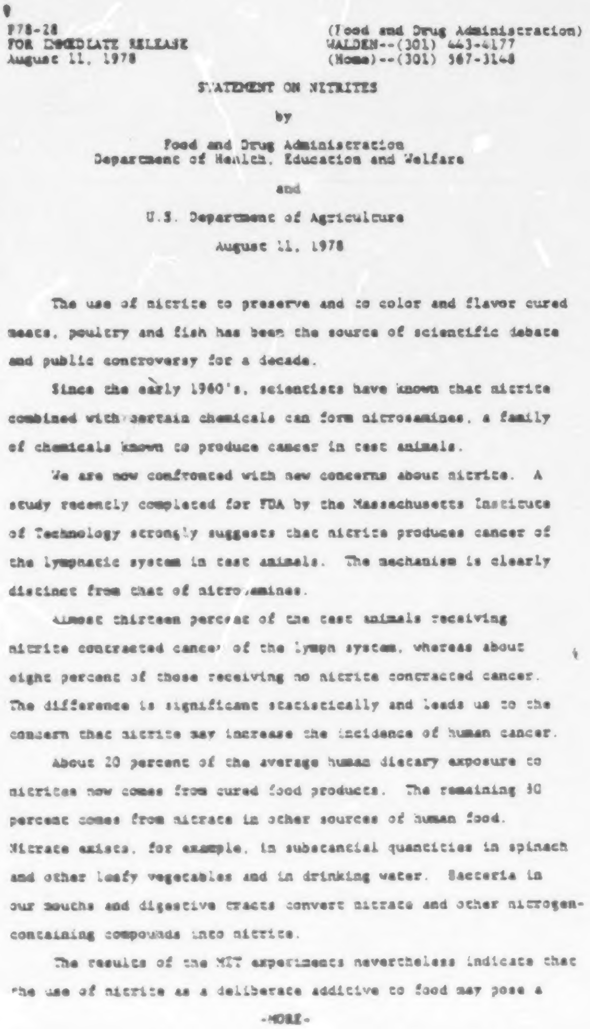
BEST COPY AVAILABLE

-Keep release brief. Two double-spaced pages fill about twelve inches of newspaper column. Most editors cannot use more than that.
-Use short words, short sentences, and short paragraphs. Watch spelling and sentence structure.

* * *

O.K. Read the sample press release below. Then, write two press releases. Get some friends to "correct" them, after they read this sheet. Once you are confident that you can write press releases, DO IT!

P.S.: Remember that radio public service spot announcements must be very brief--reading time less than 30 seconds!!!!



P78-28
FOR IMMEDIATE RELEASE
August 11, 1978

(Food and Drug Administration)
WALDEN--(301) 443-4177
(Home)--(301) 567-3148

STATEMENT ON NITRITES

by

Food and Drug Administration
Department of Health, Education and Welfare

and

U.S. Department of Agriculture

August 11, 1978

The use of nitrite to preserve and to color and flavor cured meats, poultry and fish has been the source of scientific debate and public controversy for a decade.

Since the early 1960's, scientists have known that nitrite combined with certain chemicals can form nitrosamines, a family of chemicals known to produce cancer in test animals.

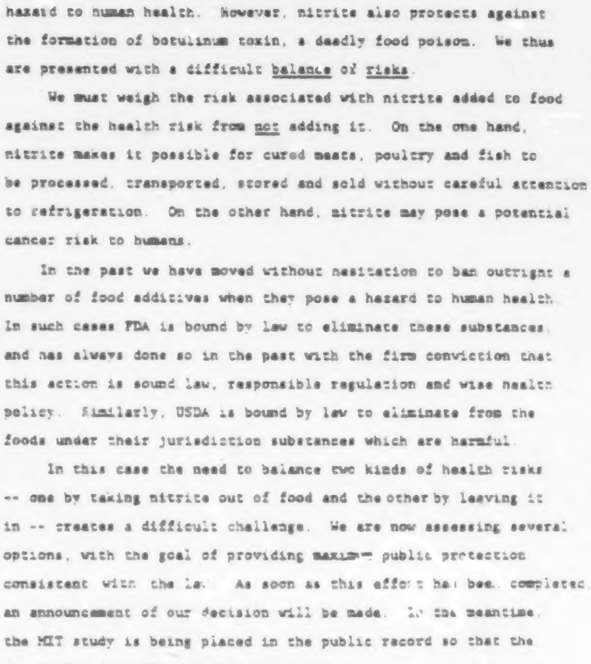
We are now confronted with new concerns about nitrite. A study recently completed for FDA by the Massachusetts Institute of Technology strongly suggests that nitrite produces cancer of the lymphatic system in test animals. The mechanism is clearly distinct from that of nitrosamines.

Almost thirteen percent of the test animals receiving nitrite contracted cancer of the lymph system, whereas about eight percent of those receiving no nitrite contracted cancer. The difference is significant statistically and leads us to the concern that nitrite may increase the incidence of human cancer.

About 20 percent of the average human dietary exposure to nitrites now comes from cured food products. The remaining 80 percent comes from nitrate in other sources of human food. Nitrate exists, for example, in substantial quantities in spinach and other leafy vegetables and in drinking water. Bacteria in our mouths and digestive tracts convert nitrate and other nitrogen-containing compounds into nitrite.

The results of the MIT experiments nevertheless indicate that the use of nitrite as a deliberate additive to food may pose a

-MORE-



hazard to human health. However, nitrite also protects against the formation of botulinum toxin, a deadly food poison. We thus are presented with a difficult balance of risks.

We must weigh the risk associated with nitrite added to food against the health risk from not adding it. On the one hand, nitrite makes it possible for cured meats, poultry and fish to be processed, transported, stored and sold without careful attention to refrigeration. On the other hand, nitrite may pose a potential cancer risk to humans.

In the past we have moved without hesitation to ban outright a number of food additives when they pose a hazard to human health. In such cases FDA is bound by law to eliminate these substances, and has always done so in the past with the firm conviction that this action is sound law, responsible regulation and wise health policy. Similarly, USDA is bound by law to eliminate from the foods under their jurisdiction substances which are harmful.

In this case the need to balance two kinds of health risks -- one by taking nitrite out of food and the other by leaving it in -- creates a difficult challenge. We are now assessing several options, with the goal of providing maximum public protection consistent with the law. As soon as this effort has been completed an announcement of our decision will be made. In the meantime, the MIT study is being placed in the public record so that the external scientific scrutiny can commence.

####

DISTINGUISHING FACT AND OPINION

In a discussion we hear people make statements which they want us to accept as TRUE! They want us to believe something. To know if we should accept what they tell us, we first have to know if they are making a statement which is a fact or an opinion. Look at these two examples:

1. Nuclear energy is very dangerous as a way to get electric power.
2. Nuclear generating plants are being constructed, today, in every region of the United States.

The first statement offers us an interpretation of the facts. It is a statement of OPINION. The second statement offers us a factual assertion (whether it is true or false is another matter).

READ THE FOLLOWING STATEMENTS. WRITE F BEFORE THOSE WHICH ARE FACTUAL STATEMENTS (WHETHER TRUE OR FALSE). WRITE O BEFORE STATEMENTS OF OPINION.

_____1. "Watch out for the name of products. Read the labels carefully."

_____2. "Right now we know little about the long range effects of some food additives on human beings."

_____3. "Upton Sinclair wrote the book, The Jungle, in 1906."

_____4. "All 'natural' foods are good for you."

_____5. "The Delaney Clause requires the Federal FDA to ban any additive in food that produces cancer in test animals."

_____6. "The Delaney Clause should be changed by Congress."

_____7. "The Delaney Clause misleads people about the safety of foods and food additives."

_____8. "Some good food additives occur naturally in foods."

_____9. "There was a lot of public controversy surrounding the ban placed upon the sweetener cyclamate in 1969."

____10. "It is dangerous to add chemicals to our foods."

51

Review Time

MATCH BY PLACING THE NUMBER OF THE CORRECT DEFINITION ON THE BLANK BEFORE THE WORD.

_____A. Emulsifier
_____B. Anti-caking agents
_____C. Firming agent
_____D. Stabilizers
_____E. Thickeners
_____F. Alkalies
_____G. Carcinogen
_____H. Gras List
_____I. PPM
_____J. Preservatives
_____K. Toxic
_____L. Contaminate
_____M. Nutrient Supplements
_____N. FDA
_____O. Acid
_____P. Sweeteners
_____Q. Food Additives

1. Food additives which provide consistency and "body" to many foods
2. Poisonous
3. A cancer-causing substance
4. Food additives which help combine ingredients which normally don't mix well
5. Food additives which keep powders, salts, and sugar free-flowing
6. Food additives which keep solids and liquids from separating
7. Food additives used to intensify the flavor of many foods
8. Food additives which keep fruits and vegetables from becoming soft and mushy while being processed
9. Food and Drug Administration
10. Food additives used to neutralize excess acidity
11. Food additives used to give foods a certain "taste" enjoyed by most people
12. Natural or man-made substances which are added directly to food for a specific purpose or arrive there incidentally
13. Generally Recognized as Safe
14. To make something unfit for use by introducing unhealthy or unwanted substances
15. Food additives which keep foods from spoiling for longer-than-normal periods of time
16. Unit for measuring the presence of additives
17. Food additives designed to increase a food's value

ACACIA, ACETAL, ACETALDEHYDE PHENETHYL PROPYL ACETAL PEPITAL, ACETANISOLE, AGAR-AGAR, ALKANET ROOT

CARRAGEENAN CHONDRUS EXTRACT, CARVACRYL ETHYL ETHER, CINNAMYL BUTYRATE, DEXTROSE, CUMINALDEHYDE

DIHYDROCOUMARIN, FARNESOL, FUMARIC ACID, GUM GUAIAC

Student Activity Sheet #13
Food Additives

Exploring Food Additives

ANSWER EACH QUESTION:

1. A loaf of bread is "enriched" with certain vitamins and minerals while margarine is labeled "fortified." What is the difference?

2. List four advantages of using food additives.

3. Safety questions have been raised about some food additives. Name four of these additives and the potential problems.

4. What is the difference between carrots sold at the local supermarket and organic carrots sold by the health-food store?

5. What is the Delaney Clause? Why is it controversial?

6. Name the two sources of ingredients found in processed foods.

7. What is the difference between intentional and incidental food additives?

8. Sometimes additives are referred to as "chemicals," as opposed to food ingredients. Is that a good description? Why?

9. What are processed foods?

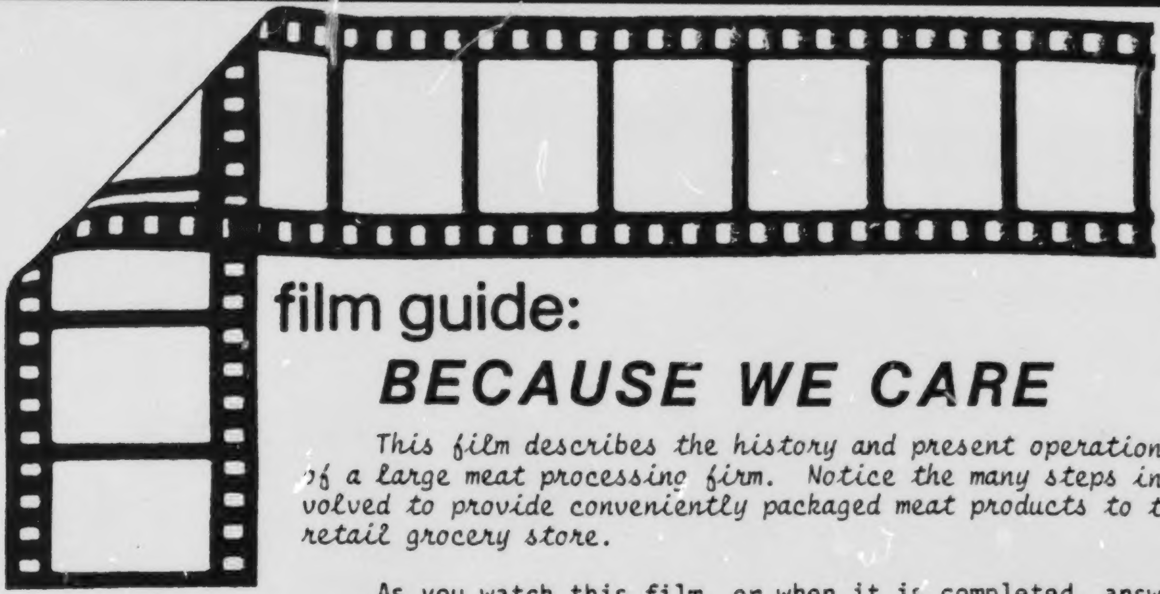
10. How can agricultural chemicals get into our foods?

GAZETTE
Sale

Eat, Drink, & Be Healthy

NOW THAT YOU HAVE COMPLETED THE ACTIVITIES IN THE FOOD ADDITIVES PAL, YOU SHOULD BE ABLE TO:

1. Define food additive.
2. Recognize why food manufacturers use food additives.
3. Identify the types of ingredients found in processed foods.
4. Recognize why there is concern over the use of food additives.
5. Identify the use of acids as food additives.
6. Recognize the use of alkalies as food additives.
7. Identify the use of stabilizers as food additives.
8. Recognize the use of thickeners as food additives.
9. Identify the use of firming agents as food additives.
10. Recognize the use of anti-caking agents as food additives.
11. Identify the use of emulsifiers as food additives.
12. Identify the use of preservatives as food additives.
13. Recognize the problem with using nitrites in foods.
14. Identify the use of nutrient supplements as food additives.
15. Recognize the use of sweeteners as food additives.
16. Recognize that contaminants may also be classified as additives.
17. Describe an advantage of using food additives.
18. Identify the government organization established soon after the publishing of Upton Sinclair's book, The Jungle.
19. Define the GRAS List.
20. Explain the Delaney Clause.
21. Identify the problem from the use of cyclamates, saccharin, Red Dye #2, and sodium nitrite.
22. Recognize the difference between a food advertisement and a food label.
23. Identify the organization to contact to report a grievance about a food product.



film guide:

BECAUSE WE CARE

This film describes the history and present operations of a large meat processing firm. Notice the many steps involved to provide conveniently packaged meat products to the retail grocery store.

As you watch this film, or when it is completed, answer the following questions:

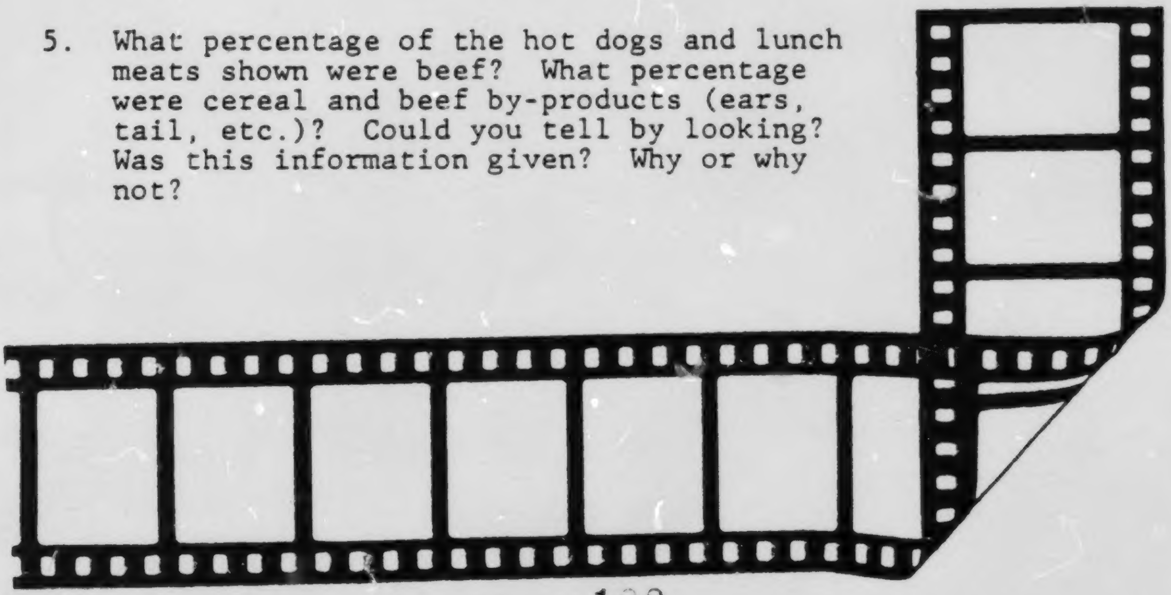
1. How did looking at all that food make you feel?

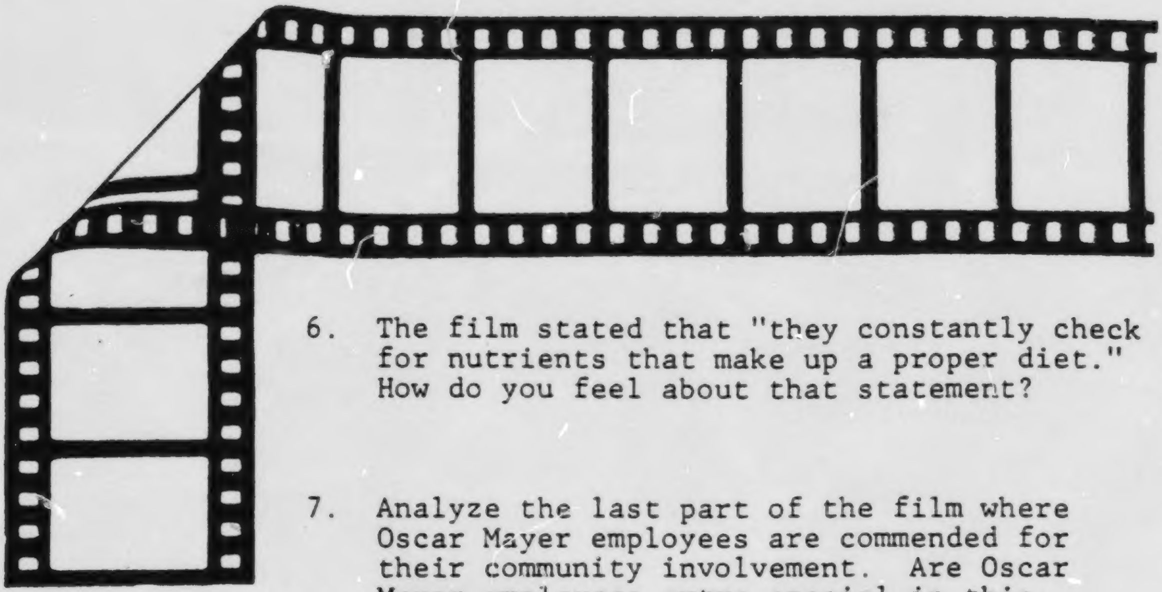
2. What is the purpose of the Oscar Mayer song?

3. How were the chemical flavorings described?

4. Was any mention made of the use of certain food additives? Why or why not?

5. What percentage of the hot dogs and lunch meats shown were beef? What percentage were cereal and beef by-products (ears, tail, etc.)? Could you tell by looking? Was this information given? Why or why not?





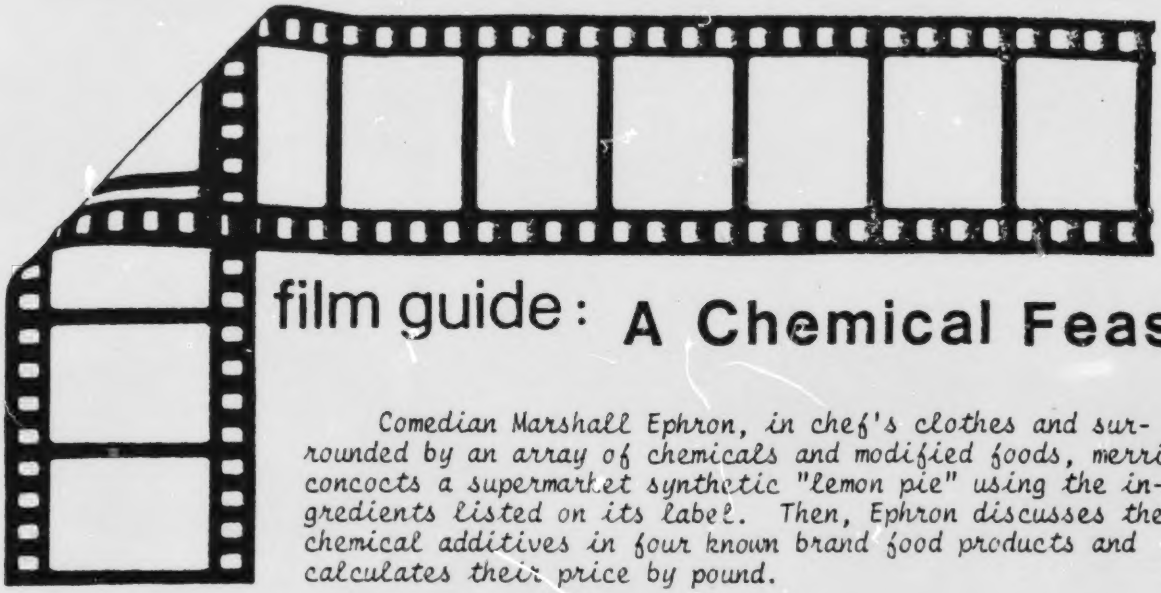
6. The film stated that "they constantly check for nutrients that make up a proper diet." How do you feel about that statement?

7. Analyze the last part of the film where Oscar Mayer employees are commended for their community involvement. Are Oscar Mayer employees extra special in this respect? How does this information help sell hot dogs?

8. The use of "taste panels" for quality control is described. Who are these people? Is their judgment on taste any better than yours?

9. Some people, fearful of the potential danger of sodium nitrite, avoid eating cured meats--such as bacon, hot dogs, ham, etc. Is anything mentioned about this in the film? Why or why not?

10. "Quality is a big word at Oscar Mayer," says the film. This is a nice phrase, but what does it mean? What does it tell you about their meat?



film guide: A Chemical Feast

Comedian Marshall Ephron, in chef's clothes and surrounded by an array of chemicals and modified foods, merrily concocts a supermarket synthetic "lemon pie" using the ingredients listed on its label. Then, Ephron discusses the chemical additives in four known brand food products and calculates their price by pound.

As you watch this film, or when it is completed, answer the following questions:

1. Why do manufacturers use chemicals in food processing?

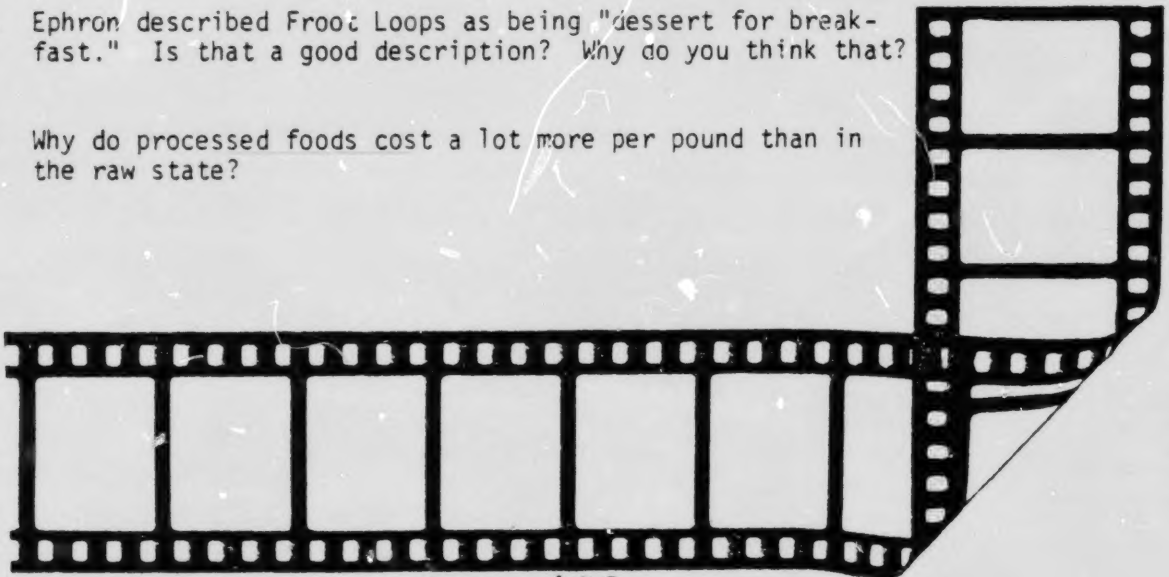
2. Ephron described a couple chemicals he used as "emulsifiers." Why are emulsifiers used in food processing?

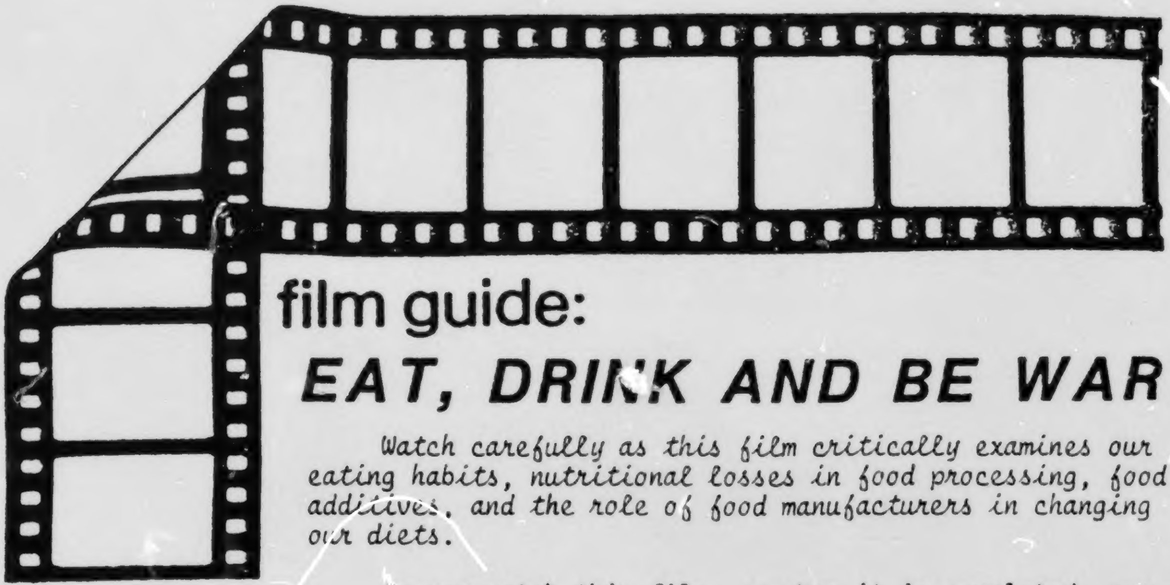
3. Why did Ephron describe his lemon cream pie as "no lemon, eggs, cream . . . just pie"?

4. Why did the cereal manufacturer choose to spell fruit as "froot"?

5. Ephron described Froot Loops as being "dessert for breakfast." Is that a good description? Why do you think that?

6. Why do processed foods cost a lot more per pound than in the raw state?



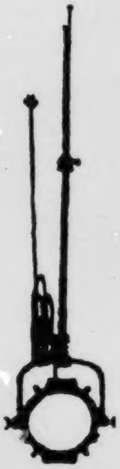


film guide:

EAT, DRINK AND BE WARY

Watch carefully as this film critically examines our eating habits, nutritional losses in food processing, food additives, and the role of food manufacturers in changing our diets.

As you watch this film, or when it is completed, answer the following questions:



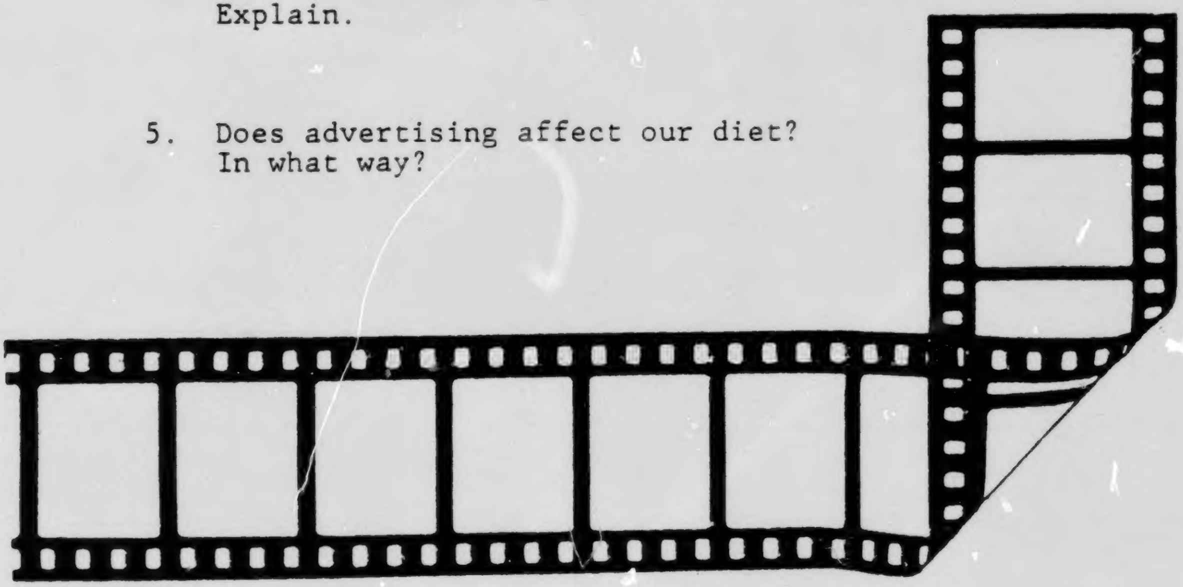
1. What happens to flour during processing?

2. What class of additives are the most dangerous?

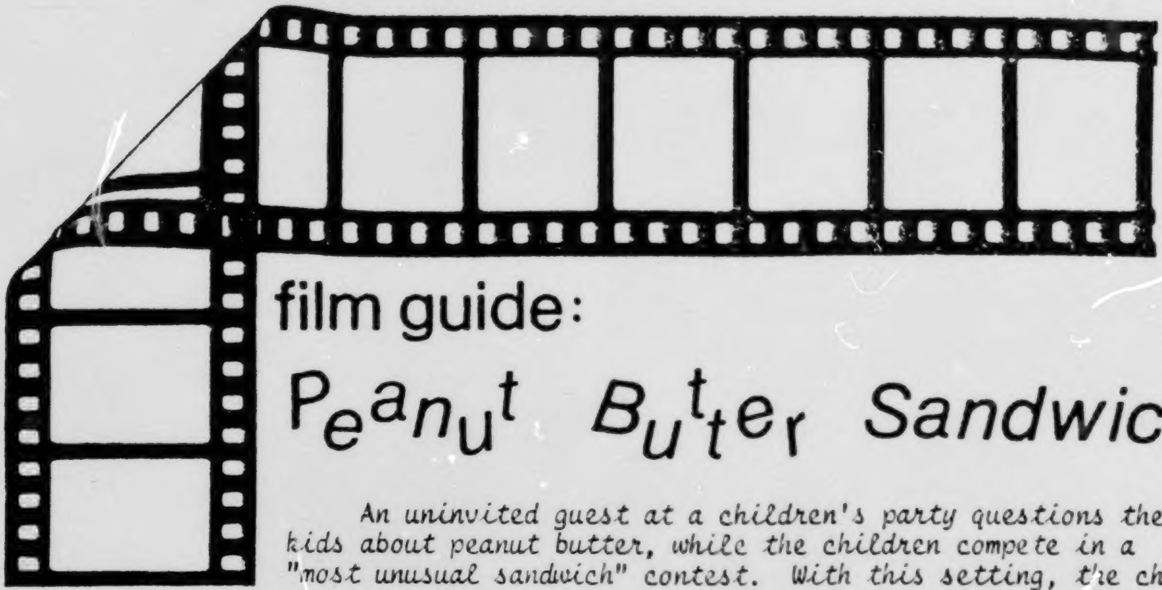
3. Why is the use of sodium nitrite dangerous?

4. Are all additives good or bad? Explain.

5. Does advertising affect our diet? In what way?



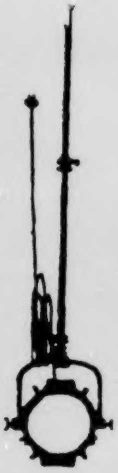
Film Guide #3
Food Additives



film guide:

Peanut Butter Sandwich

An uninvited guest at a children's party questions the kids about peanut butter, while the children compete in a "most unusual sandwich" contest. With this setting, the children's answers lead to the film's purpose--a look at the food processing of the humble peanut to make peanut butter.



As you watch this film, or when it is completed, answer the following questions:

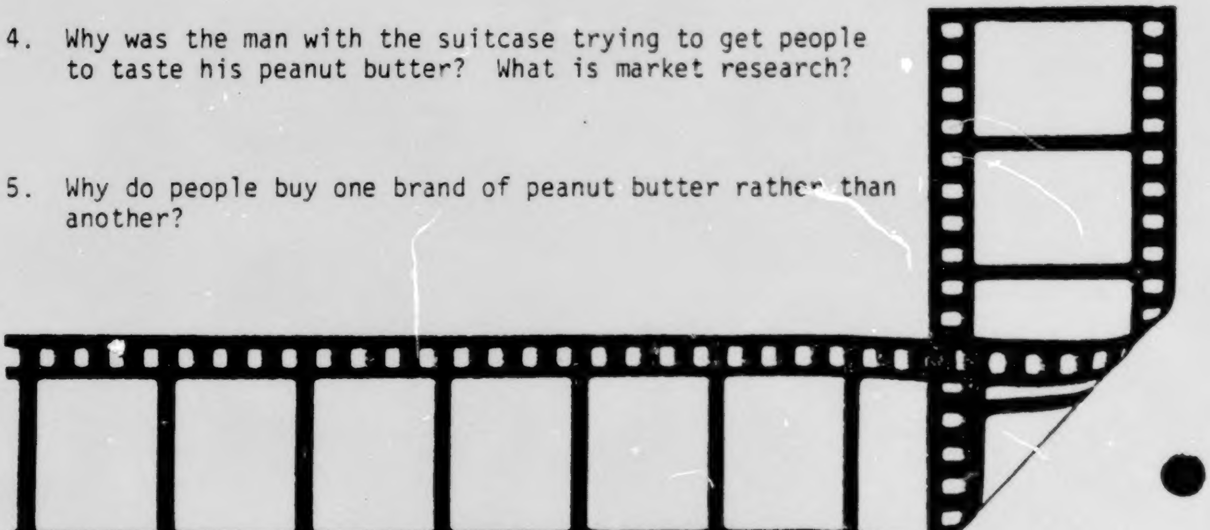
1. What is meant by "processed" food?

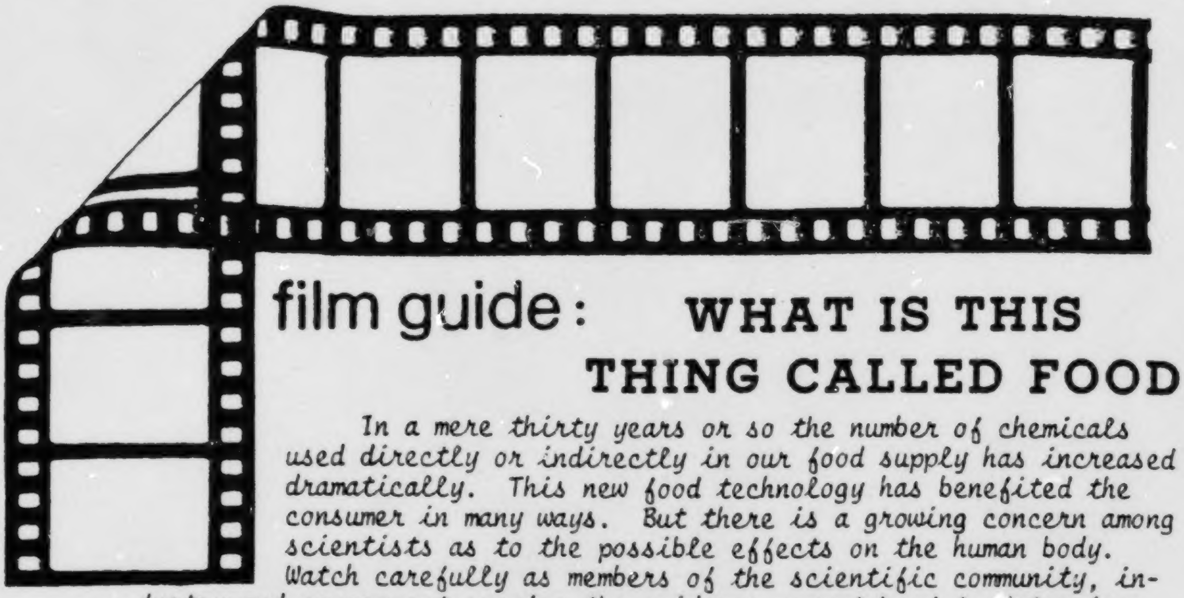
2. What are the steps in the processing of peanuts?

3. Name some other foods that are factory processed before reaching the supermarket. What are some foods that we eat in their natural state? What is meant by "organic foods"?

4. Why was the man with the suitcase trying to get people to taste his peanut butter? What is market research?

5. Why do people buy one brand of peanut butter rather than another?





film guide: WHAT IS THIS THING CALLED FOOD?

In a mere thirty years or so the number of chemicals used directly or indirectly in our food supply has increased dramatically. This new food technology has benefited the consumer in many ways. But there is a growing concern among scientists as to the possible effects on the human body. Watch carefully as members of the scientific community, industry and government examine the evidence now at hand to determine what, if anything, can be done to safeguard our future health.

As you watch this film, or when it is completed, answer the following questions:

1. Define "food technology."

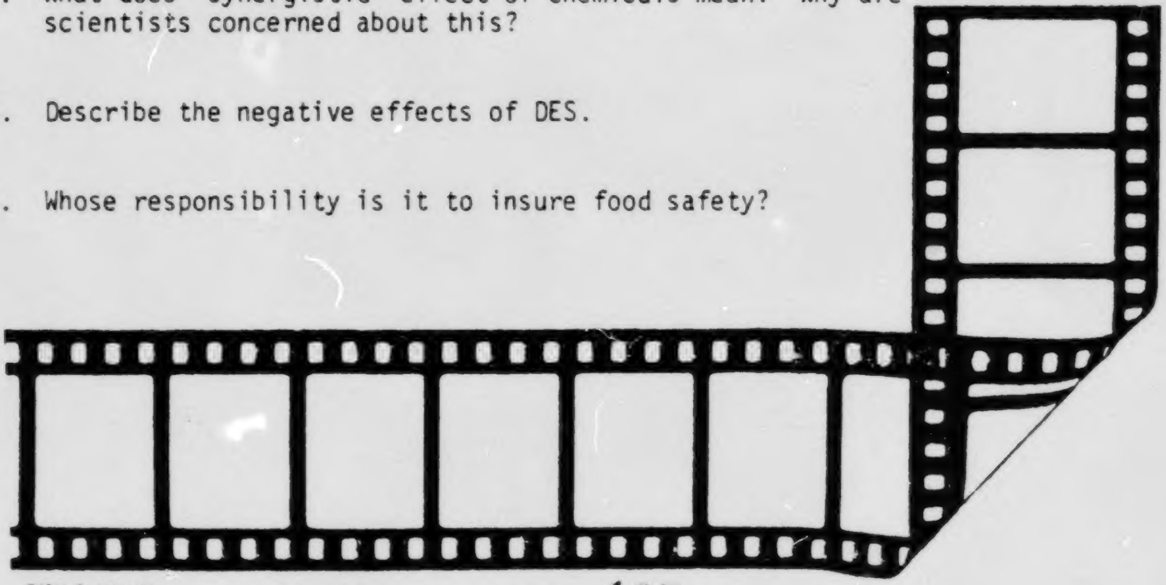
2. According to the film, how many different chemicals are added, directly or indirectly, to our food supply?

3. List three reasons to use chemicals in food products.

4. What does "synergistic" effect of chemicals mean? Why are scientists concerned about this?

5. Describe the negative effects of DES.

6. Whose responsibility is it to insure food safety?

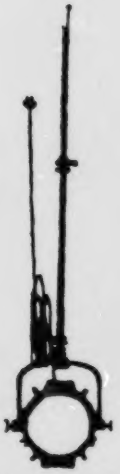


film guide:

THE HEALTH FOOD MOVEMENT

This film examines the increasing interest in organically grown and unprocessed foods. Basic terms used in the health food movement are defined. Activities of three typical health food advocates help explain details of the health food movement.

As you watch this film, or when it is completed, answer the following questions:



1. What does "organically grown" mean? Why are they called "health foods"?

2. According to the organic farmer, how does he manage without chemical fertilizers and such controls as chemical weed killers?

3. Why did the young lawyer give up his practice to enter the health food movement? Do you agree with him? Why or why not?

4. What items were for sale in the store he managed?

5. What were some of the early problems in turning to health foods as described by the young mother? What reasons does she give for her family's radical change in life style? Do you agree? Why or why not?

61

WHAT ARE FOOD ADDITIVES?

SODIUM CARBOXYMETHYLCELLULOSE

POTASSIUM IODIDE

AMMONIATED GLYCYRRHIZIN

ARABINOGALACTAN

FERROUS GLUCONATE

BUTYLATED HYDROXYANISOLE

SORBITAN MONOSTEARATE

AZODICARBONAMIDE

DIETHYL PYROCARBONATE

DIOCTYL SODIUM SULFOSUCCINATE

DIMETHYLPOLYSILOXANE

THIODIPROPIONIC ACID

Transparency Master #1
Food Additives

62

WHY ADDITIVES?

IMPROVE NUTRITIONAL VALUE

FACILITATE FOOD PREPARATION

REDUCE COSTS

IMPROVE THE QUALITY

ENHANCE ACCEPTABILITY

MAKE FOOD MORE AVAILABLE

Intentional Additives

- Acids and Alkalies
- Stabilizers and Thickeners
- Nutrient Supplements
- Flavors and Flavoring Agents
- Preservatives
- Bleaching and Maturing Agents
- Colorings
- Emulsifiers
- Sweeteners

Transparency Master #3
Food Additives

CONTROL ACIDITY*

*Acids
Alkalies
Leavening Agents

ENHANCE FLAVOR AND TASTE*

*Flavors
Flavoring Agents
Sweeteners

65

Transparency Master #4
Food Additives

IMPART DESIRED COLOR*

*Colorings

MAINTAIN DESIRED CONSISTENCY*

*Thickeners, Stabilizers, and Emulsifiers

66

PRESERVATIVES

Antioxidants

FRESH GROUND

Inhibitors

Sequestrants

MAINTAIN APPEARANCE, PALATABILITY AND WHOLESOMENESS

MORE AND MORE ADDITIVES.......

Foaming Agents

Solvents

Firming Agents

Anticaking Agents

Humectants

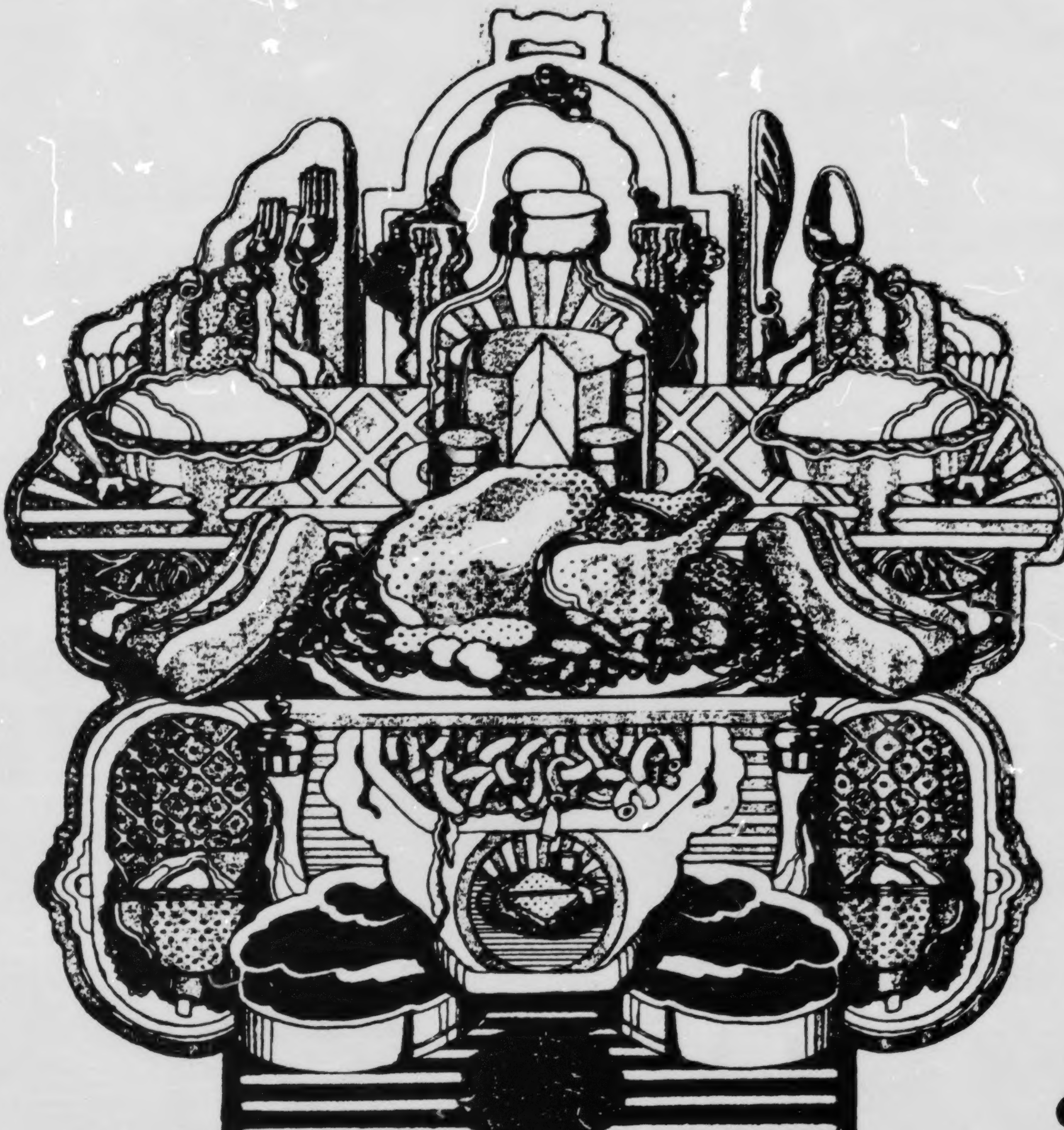
Curing Agents

Bleaching and Maturing Agents

Nutrient Supplements

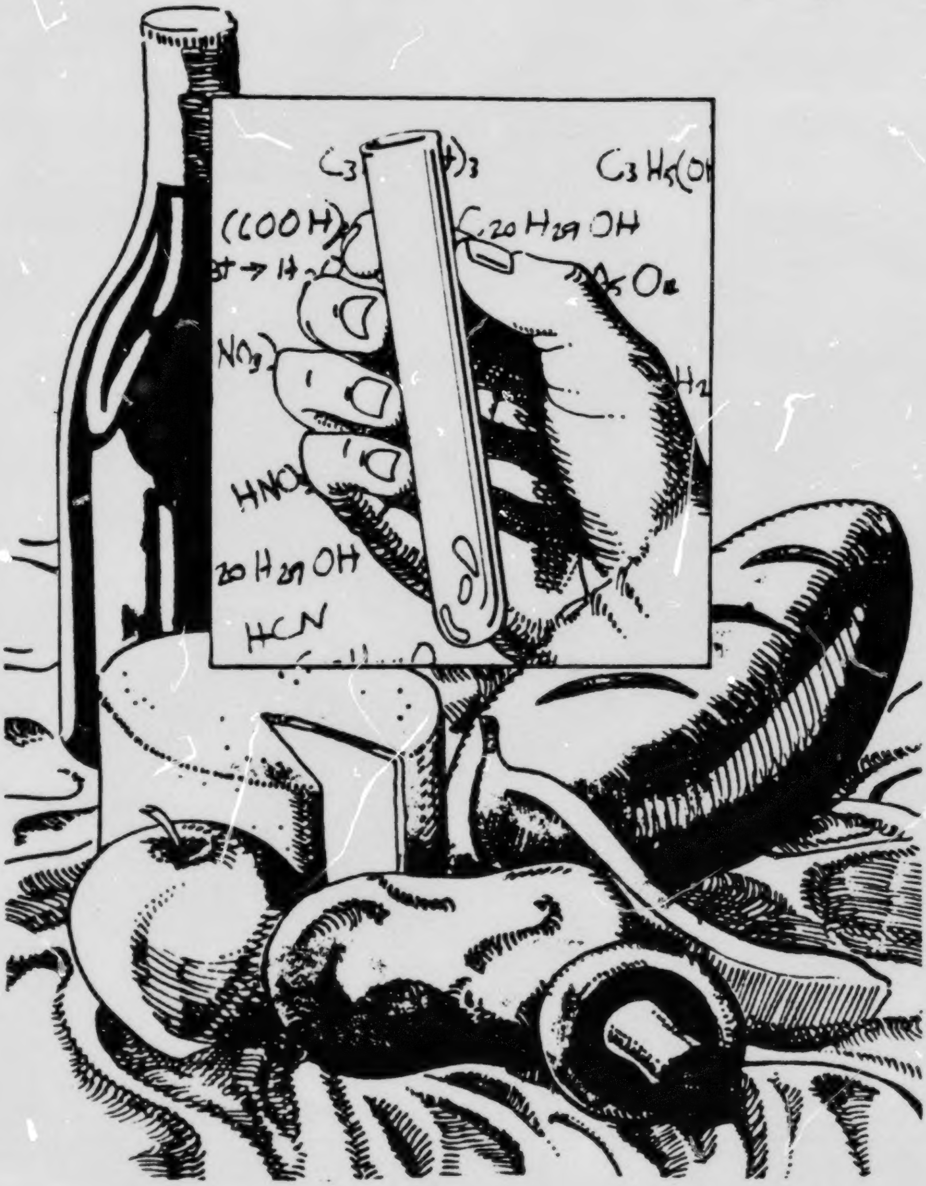
Transparency Master #7
Food Additives

The growing worry over the chemicals in our food

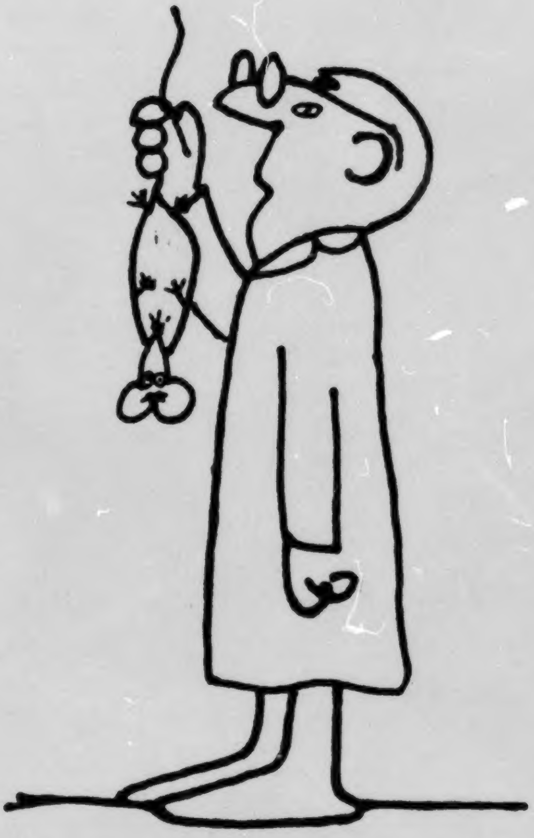


Transparency Master #8
Food Additives

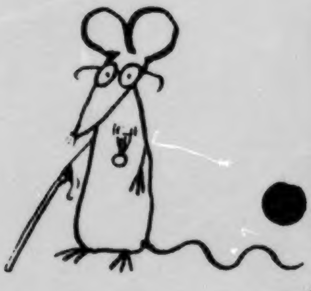
Natural Poisons In Food


C₃H₅(OH
(COOH)
C₂₀H₂₉OH
HNO
20 H29 OH
HCN

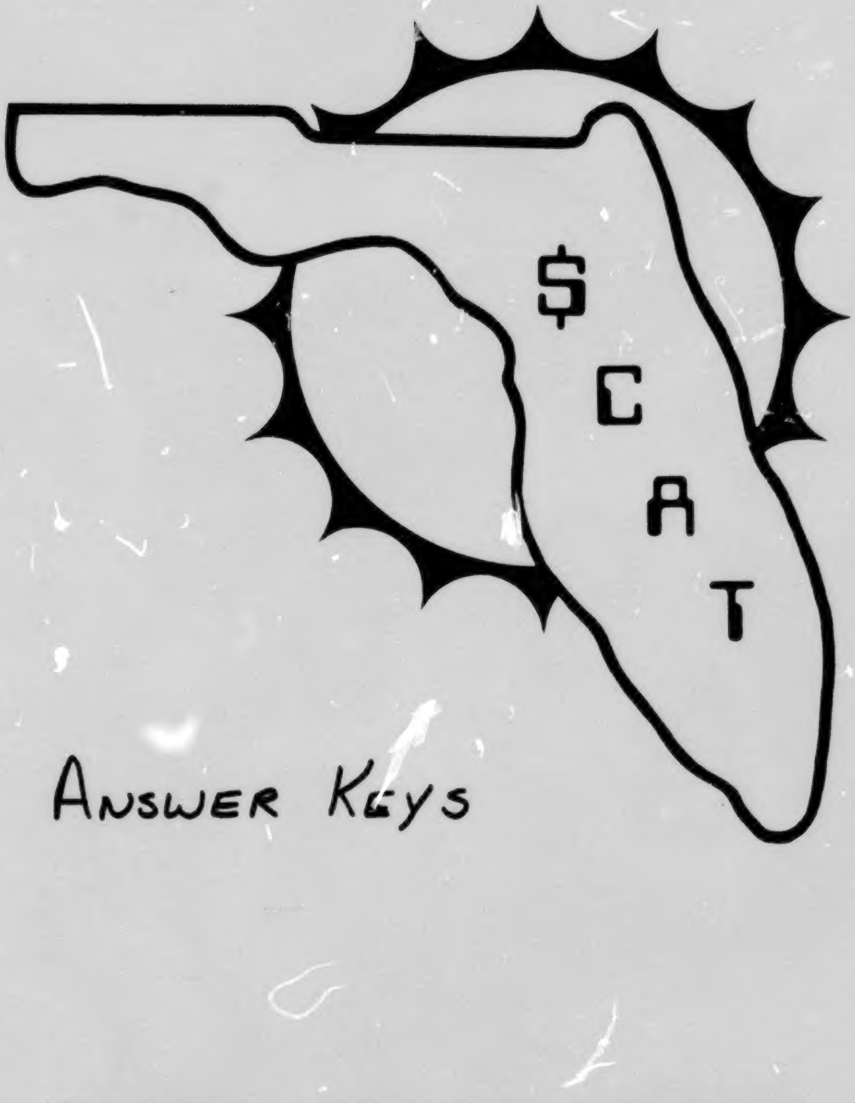
EVERYTHING DOESN'T CAUSE CANCER



But how can we tell which chemicals cause cancer and which ones don't?



Transparency Master #10
Food Additives



ANSWER KEYS

CLASSROOM TEACHERS ARE AUTHORIZED TO
REPRODUCE THIS ORIGINAL COPY FOR USE
IN THEIR CLASSROOMS.

NAME ______________________

CLASS ______________________

DATE ______________________

Eat, Drink, & Be Healthy

1 Ⓐ ● Ⓒ Ⓓ
2 ● Ⓑ Ⓒ Ⓓ
3 ● Ⓑ Ⓒ Ⓓ
4 Ⓐ Ⓑ ● Ⓓ
5 ● Ⓑ Ⓒ Ⓓ
6 Ⓐ Ⓑ Ⓒ ●
7 Ⓐ Ⓑ ● Ⓓ
8 Ⓐ ● Ⓒ Ⓓ
9 Ⓐ Ⓑ Ⓒ ●
10 ● Ⓑ Ⓒ Ⓓ
11 Ⓐ Ⓑ ● Ⓓ
12 Ⓐ Ⓑ Ⓒ ●
13 Ⓐ ● Ⓒ Ⓓ
14 ● Ⓑ Ⓒ Ⓓ
15 Ⓐ Ⓑ ● Ⓓ
16 ● Ⓑ Ⓒ Ⓓ
17 Ⓐ ● Ⓒ Ⓓ
18 Ⓐ Ⓑ ● Ⓓ
19 ● Ⓑ Ⓒ Ⓓ
20 Ⓐ Ⓑ Ⓒ ●
21 Ⓐ ● Ⓒ Ⓓ
22 Ⓐ Ⓑ ● Ⓓ
23 Ⓐ Ⓑ Ⓒ ●

What's your preference?

1. Do you ever want foods you can prepare quickly and easily?
   ☐ yes ☐ no

ANSWERS WILL VARY.

2. Do you like being able to select local "home-grown" fruits and vegetables as well as foods grown in other parts of the country?
   ☐ yes ☐ no

3. Do you want nutrients which are lost during processing returned to the food?
   ☐ yes ☐ no

4. Do you want to eat residues of chemicals such as pesticides or industrial pollutants along with your food?
   ☐ yes ☐ no

5. Do you like your cake batters to rise high and light during baking?
   ☐ yes ☐ no

6. Do you want chemicals that have been shown to cause cancer in animals added to your foods?
   ☐ yes ☐ no

7. Do you like your salt to pour easily from the shaker -- even in humid weather?
   ☐ yes ☐ no

8. Do you like peanut butter that doesn't separate?
   ☐ yes ☐ no

9. Do you want the government to ban chemicals that would do away with American favorites such as the hot dog because there may be a health risk involved?
   ☐ yes ☐ no

10. Do you want bread to stay mold-free as long as possible?
    ☐ yes ☐ no

11. Do you feel it is the government's duty to protect us from unsafe food?
    ☐ yes ☐ no

12. Do you prefer firm rather than mushy canned tomatoes?
    ☐ yes ☐ no

Each of the above questions refers to some aspect of food additives--their uses, benefits, safety questions, or regulations. Look over your answers. Do you see why there may be controversies over the use of additives in our foods today?

QUIZ

FOOD PACKAGES MUST SHOW THEIR INGREDIENTS ACCORDING TO AMOUNTS: THE FIRST INGREDIENT IS PRESENT IN THE GREATEST QUANTITY, AND SO ON THROUGH THE LIST. THE INGREDIENTS LISTED BELOW ARE EXACTLY AS THEY APPEAR ON FOOD PACKAGES. MATCH THE PRODUCT TO THE INGREDIENT LISTING:

D 1. Sugar, enriched flour (bleached), shortening (with freshness preserved by BHA and BHT), nonfat dry milk, propylene glycol monoesters and mono and diglycerides, leavening, wheat starch, dried corn syrup, salt, corn cereal, artificial flavor, guar gum, soy lecithin, dried egg whites, cherry fruit and extract, sodium lauryl sulfate, artificial color.

E 2. Water, coconut and vegetable oil, sucrose, dextrose, sodium caseinate, vegetable protein, polysorbate 60, sorbitan monostearate, carrageenan, guar gum, vanilla artificial flavor and color.

H 3. Corn syrup solids, partially hydrogenated vegetable oil (may contain one or more of the following oils: coconut, cottonseed, palm, palm kernel, safflower, or soybean), sodium caseinate, mono- and diglycerides, dipotassium phosphate, artificial flavor, and artificial colors.

F 4. Liquid corn oil, partially hydrogenated corn oil, water, salt, nonfat dry milk, vegetable lecithin, vegetable mono and diglycerides, sodium benzoate as a preservative, artificially colored, artifically flavored, vitamin A palmitate added.

A 5. Sugar and dextrose, gelatin, fumaric and malic acids, sodium citrate, salt, artificial flavor and color, vitamin C.

G 6. Sugar, citric acid (for tartness), calcium phosphates, (regulate tartness and prevent caking), modified starches (provide body), potassium citrate (regulates tartness), cellulose gum (vegetable gum--provides body), natural orange flavor, vitamin C, hydrogenated coconut oil, artificial flavor, artificial color, vitamin A palmitate, BHA (a preservative).

B 7. Hydrolyzed plant protein, salt, corn starch, hydrogenated vegetable oil, sugar, autolyzed yeast, caramel coloring, onion powder, beef extract, disodium inosinate, disodium guanylate, garlic powder, spice and natural flavor.

C 8. Carbonated water, caramel color, phosphoric acid, sodium saccharin, sodium citrate, caffeine, natural flavorings and citric acid.

A. Raspberry Gelatin Dessert

B. Beef Bouillon Cubes

C. Diet Cola Soft Drink

D. Cherry Chip Cake Mix

E. Non-dairy Whipped Topping

F. Margarine

G. Instant Breakfast Drink

H. Non-dairy Coffee Creamer

ACACIA, ACETAL, ACETALDEHYDE PHENETHYL PROPYL ACETAL PEPITAL, ACETANISOLE, AGAR-AGAR, ALKANET ROOT

Intentional Additives

MATCH BY PLACING THE LETTER OF THE CORRECT TYPE OF ADDITIVE ON THE BLANK. (SOME MAY HAVE MORE THAN ONE CORRECT ANSWER.)

ADDITIVES

K 1. Vanillin

F 2. Calcium Phosphate

A 3. Phosphoric

K 4. Garlic

J 5. BHA

J 6. Calcium Propionate

I,J 7. Ascorbic Acid

M 8. Saccharin

I,L 9. Carotene

I 10. Vitamin D

D 11. Gum Arabic

A 12. Tartaric

G,J 13. Lecithin

L 14. Red Dye #40

A,J,K 15. Citric Acid

N 16. Packaging Particles

F 17. Calcium Stearate

C,G 18. Carrageenan

B 19. Ammonium Bicarbonate

G,P 20. Diglycerides

K 21. MSG

O 22. Chlorine Dioxide

J,M 23. Sucrose

D 24. Gelatin

E 25. Calcium Salts

TYPES OF ADDITIVES

A. Acids

B. Alkalies

C. Stabilizers

D. Thickeners

E. Firming Agents

F. Anti-caking Agents

G. Emulsifiers

H. Humectants

I. Nutrient Supplements

J. Preservatives

K. Flavors and Flavoring Agents

L. Colorings

M. Sweeteners

N. Contaminants

O. Bleaching and Maturing Agents

P. Foaming Inhibitors

CARRAGEENAN CHONDRUS EXTRACT, CARVACRYL ETHYL ETHER, CINNAMYL BUTYRATE, DEXTROSE, CUMINALDEHYDE

What's In a Name?

WISE CONSUMERS KNOW THAT SOMETIMES A LABEL CAN BE MISLEADING! PRODUCTS ARE DESCRIBED WITH DELICIOUS-SOUNDING TERMS THAT MAY MAKE THE CONSUMER HUNGRY ENOUGH TO BUY THE PRODUCT WITHOUT FULLY REALIZING EXACTLY WHAT IS GOING INTO HIS STOMACH.

ANALYZE THE FOLLOWING TERMS CAREFULLY FOR DECEPTIVE ADVERTISING TECHNIQUES AND WRITE YOUR ANSWERS UNDER EACH DESCRIPTION.

FROOT LOOPS
with other natural flavors

FROOT MAKES YOU THINK OF FRUIT

CREME FINGERS

CREME MAKES YOU THINK OF CREAM

CHEEZ DOODLES

CHEEZ MAKES YOU THINK OF CHEESE

CRUNCH BERRIES
imitation berries

LARGER PRINT SAYS BERRIES, SMALLER PRINT FOR IMITATION

JEL-CREME DESSERT ROLLS

CREME MAKES YOU THINK OF CREAM

TASTES LIKE CHEESE

DOESN'T SAY IS CHEESE, ONLY TASTES LIKE CHEESE

96% FAT FREE

DOESN'T SAY IT CONTAINS 4% FAT

BUTTERY

LIKE BUTTER, DOESN'T SAY IS BUTTER

VINE GROWN TOMATOES

VINE GROWN, NOT VINE RIPENED

MADE RICH AND CREAMY ...

YOU THINK OF BUTTER AND CREAM

VANILLA-FLAVORED ICE CREAM

DOESN'T SAY THE ICE CREAM IS MADE FROM REAL VANILLA

BUTTERY GOLDEN CAKE WITH THE RICH CHOCOLATEY FROSTING

LIKE BUTTER AND LIKE CHOCOLATE: DOESN'T SAY MADE FROM REAL BUTTER AND REAL CHOCOLATE

CLIP A PROBLEM!

BRING TO CLASS A CLIPPING FROM THE LOCAL NEWSPAPER, REPORTING ON A CONSUMER PROBLEM. WHAT IS THE PROBLEM?

FILL IN THE FOLLOWING FORM. FIRST, PUT IN YOUR GOAL (OR THE GOAL OF THE CONSUMER WITH THE COMPLAINT). THEN, LIST THE THINGS SHE HAS GOING FOR HER -- THE FORCES HELPING HER TO ACHIEVE HER GOAL. NEXT, FILL IN THE OPPOSITE OF HER GOAL -- THE FORCES OPERATING AGAINST HER.

YOUR GOAL	THE OPPOSITE OF YOUR GOAL
ANSWERS WILL VARY	ANSWERS WILL VARY
FORCES BLOCKING OR DRIVING AGAINST THE ACHIEVEMENT OF YOUR GOAL	FORCES SUPPORTING THE ACHIEVEMENT OF YOUR GOAL
ANSWERS WILL VARY	ANSWERS WILL VARY

GIVEN YOUR ASSESSMENT OF THE FORCES, WHAT ARE HER CHANCES OF SUCCESS -- OF ACHIEVING HER GOAL?

LEVELS OF ACTION

Let's assume that you have a food quality problem. You found some hair in your gallon of milk. A canned ham was spoiled. Your pound of hot dogs did not weigh a pound.

WRITE OUT A SAMPLE FOOD QUALITY PROBLEM: ____________________

ANSWERS WILL VARY

Tell what action (if any) you could take on each of the following LEVELS for your problem:

INTERPERSONAL LEVEL:
Example: Go chat with the manager of the store where you bought the food.

ANSWERS WILL VARY

INTERGROUP LEVEL:
Example: Join a local consumer group and work with them. Report to the FDA in a formal complaint.

ANSWERS WILL VARY

SOCIAL SYSTEM LEVEL:
Example: Get government to pass a law or a new set of rules regarding your type of problem.

ANSWERS WILL VARY

DISTINGUISHING FACT AND OPINION

In a discussion we hear people make statements which they want us to accept as TRUE! They want us to believe something. To know if we should accept what they tell us, we first have to know if they are making a statement which is a fact or an opinion. Look at these two examples:

1. Nuclear energy is very dangerous as a way to get electric power.
2. Nuclear generating plants are being constructed, today, in every region of the United States.

The first statement offers us an interpretation of the facts. It is a statement of OPINION. The second statement offers us a factual assertion (whether it is true or false is another matter).

READ THE FOLLOWING STATEMENTS. WRITE F BEFORE THOSE WHICH ARE FACTUAL STATEMENTS (WHETHER TRUE OR FALSE). WRITE 0 BEFORE STATEMENTS OF OPINION.

0 1. "Watch out for the name of products. Read the labels carefully."

0 2. "Right now we know little about the long range effects of some food additives on human beings."

F 3. "Upton Sinclair wrote the book, The Jungle, in 1906."

0 4. "All 'natural' foods are good for you."

F 5. "The Delaney Clause requires the Federal FDA to ban any additive in food that produces cancer in test animals."

0 6. "The Delaney Clause should be changed by Congress."

0 7. "The Delaney Clause misleads people about the safety of foods and food additives."

0 8. "Some good food additives occur naturally in foods."

0 9. "There was a lot of public controversy surrounding the ban placed upon the sweetener cyclamate in 1969."

0 10. "It is dangerous to add chemicals to our foods."

'79

ACACIA, ACETAL, ACETALDEHYDE PHENETHYL PROPYL ACETAL PEPITAL, ACETANISOLE, AGAR-AGAR, ALKANET ROOT

CARRAGEENAN CHONDRUS EXTRACT, CARVACRYL ETHYL ETHER, CINNAMYL BUTYRATE, DEXTROSE, CUMINALDEHYDE

Review Time

MATCH BY PLACING THE NUMBER OF THE CORRECT DEFINITION ON THE BLANK BEFORE THE WORD.

4 A. Emulsifier
5 B. Anti-caking agents
8 C. Firming agent
6 D. Stabilizers
1 E. Thickeners
10 F. Alkalies
3 G. Carcinogen
13 H. Gras List
16 I. PPM
15 J. Preservatives
2 K. Toxic
14 L. Contaminate
17 M. Nutrient Supplements
9 N. FDA
7 O. Acid
11 P. Sweeteners
12 Q. Food Additives

1. Food additives which provide consistency and "body" to many foods
2. Poisonous
3. A cancer-causing substance
4. Food additives which help combine ingredients which normally don't mix well
5. Food additives which keep powders, salts, and sugar free-flowing
6. Food additives which keep solids and liquids from separating
7. Food additives used to intensify the flavor of many foods
8. Food additives which keep fruits and vegetables from becoming soft and mushy while being processed
9. Food and Drug Administration
10. Food additives used to neutralize excess acidity
11. Food additives used to give foods a certain "taste" enjoyed by most people
12. Natural or man-made substances which are added directly to food for a specific purpose or arrive there incidentally
13. Generally Recognized as Safe
14. To make something unfit for use by introducing unhealthy or unwanted substances
15. Food additives which keep foods from spoiling for longer-than-normal periods of time
16. Unit for measuring the presence of additives
17. Food additives designed to increase a food's value

Student Activity Sheet #13
Food Additives

DIHYDROCOUMARIN, FARNESOL, FUMARIC ACID, GUM GUAIAC

Exploring Food Additives

ANSWER EACH QUESTION:

1. A loaf of bread is "enriched" with certain vitamins and minerals while margarine is labeled "fortified." What is the difference?
ENRICHED-NUTRIENTS ADDED TO REPLACE THOSE LOST DURING PROCESSING. FORTIFIED-NUTRIENTS ADDED THAT ARE NOT ALREADY PRESENT IN THE FOOD OR ARE AT A LOW LEVEL.

2. List four advantages of using food additives.

ANSWERS WILL VARY. MAY MENTION THE PURPOSES OF VARIOUS ADDITIVES, TO ENABLE US TO HAVE CONVENIENCE FOODS, TO REDUCE COSTS, TO MAKE FOOD MORE AVAILABLE, ETC.

3. Safety questions have been raised about some food additives. Name four of these additives and the potential problems.

ANSWERS WILL VARY. MAY MENTION: CYCLAMATES, RED DYE #2, SACCHARIN, SODIUM NITRITE CAUSED CANCER IN TEST ANIMALS; CAFFEINE-POSSIBLE CAUSE OF BIRTH DEFECTS; MSG-POSSIBLE HAZARD TO INFANTS; AND SUGAR-CONTRIBUTES TO TOOTH DECAY.

4. What is the difference between carrots sold at the local supermarket and organic carrots sold by the health-food store?
ORGANIC CARROTS ARE GROWN WITHOUT THE USE OF CHEMICAL FERTILIZERS OR PESTICIDES.

5. What is the Delaney Clause? Why is it controversial? THE DELANEY CLAUSE PROHIBITS THE USE OF ANY ADDITIVE FOUND TO CAUSE CANCER IN ANIMALS OR HUMANS; CONTROVERSIAL BECAUSE DOES NOT CONSIDER BENEFITS VS. RISKS OR AMOUNTS USED.

6. Name the two sources of ingredients found in processed foods.
NATURAL AND MAN-MADE (SYNTHETIC)

7. What is the difference between intentional and incidental food additives?
INTENTIONAL ADDITIVES ARE ADDED FOR A SPECIFIC FUNCTIONAL PURPOSE WHILE INCIDENTAL ADDITIVES ARRIVE IN FOOD INDIRECTLY

8. Sometimes additives are referred to as "chemicals," as opposed to food ingredients. Is that a good description? Why?
ALL FOODS ARE CHEMICALS

9. What are processed foods?
FOODS NO LONGER IN THE SAME FORM AS WHEN HARVESTED.

10. How can agricultural chemicals get into our foods?
RESIDUES ARE LEFT ON THE FOODS IN THE FIELDS OR IN THE BODIES OF ANIMALS AND POULTRY.

DEFINITIONS OF THE WORD "ADDITIVE" DIFFER FROM ONE ANOTHER, BUT EACH TELLS THE SAME STORY. READ THE FOLLOWING THREE DEFINITIONS AND THEN TRY TO WRITE A DEFINITION OF YOUR OWN, INCLUDING IDEAS FROM ALL THREE.

ad'di·tive~

Any substance the intended use of which results or may reasonably be expected to result, directly or indirectly, in its becoming a component or otherwise affecting the characteristics of any food (including any substance intended for use in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding food; and including any source of radiation intended for any such use), if such substance is not generally recognized, among experts qualified by scientific training and experience to evaluate its safety, as having been adequately shown through scientific procedures or experience based on common use in food to be safe under the conditions of its intended use.[23]

(Legal definition used by United States Food and Drug Administration)

ad'di·tive~

An ingredient that is put into food products to improve the way they taste, look, feel, or smell; to make them last longer; and sometimes to make the food better for you.[6]

ad'di·tive~

Any substance added to food either directly and intentionally for a functional purpose, or indirectly during some phase of production, processing, storage or packaging without intending that it remain in, or serve a purpose in, the final product; does not include either the basic foodstuff itself or chance contaminants.[25]

MY DEFINITION:

ANSWERS WILL VARY.

THERE ARE TWO BROAD TYPES OF ADDITIVES:

Intentional Additives: substances purposely added to perform specific functions.[26]

Incidental Additives: substances which may be present in the finished food in trace quantities as a result of some phase of production, processing, storage, or packaging.[26]

Review Time

What are food additives, & why are they in our food?

NAME THE TYPE OF ADDITIVE--INTENTIONAL OR INCIDENTAL--ILLUSTRATED IN EACH OF THE FOLLOWING:

INTENTIONAL 1. Milk which has been fortified with Vitamin D to prevent rickets, a childhood disease in which bones are not formed properly

INCIDENTAL 2. Small amounts of cellophane that migrate from the packaging to the food

INCIDENTAL 3. Residues of chemicals used to kill insects and weeds found in grains after harvesting

INTENTIONAL 4. Low-calorie food items made with an artificial sweetener instead of sugar

A. Name ten foods you have eaten in the past week which contained intentional additives. ANSWERS WILL VARY.

B. Name ten foods you have eaten in the past week which did not contain intentional additives. ANSWERS WILL VARY.

C. Which of the above lists was the easier to do? Why do you think this is so? ANSWERS WILL VARY.

D. What do you consider to be the most important reason for using additives in processing food? Why? ANSWERS WILL VARY.

E. How could food additives be used in ways harmful to consumers? ANSWERS WILL VARY.

F. A consumer activist group has charged that one cereal company adds about a penny's worth more vitamins to one of its cereals. However, that "super-fortified" cereal costs about 30 cents more in the grocery store than the original cereal.[11] What do you think about this? Could this happen? If so, are there any other factors that could affect the price increase other than the cost of the additional vitamins? Can you name two cereals that seem to be essentially the same, except that one cereal is advertised to be "loaded" with vital vitamins and minerals and costs more than its "look-alike" without the extra nutrients? ANSWERS WILL VARY. MAY CONSIDER THE QUALITY CONTROL COST FACTOR OF ADDITIONAL VITAMINS; MAY MENTION "WHEATIES" AND "TOTAL."

DISTINGUISHING FACT AND OPINION

In a discussion we hear people make statements which they want us to accept as TRUE! They want us to believe something. To know if we should accept what they tell us, we first have to know if they are making a statement which is a fact or an opinion. Look at these two examples:

1. Nuclear energy is very dangerous as a way to get electric power.
2. Nuclear generating plants are being constructed, today, in every region of the United States.

The first statement offers us an interpretation of the facts. It is a statement of OPINION. The second statement offers us a factual assertion (whether it is true or false is another matter).

READ THE FOLLOWING STATEMENTS. WRITE F BEFORE THOSE WHICH ARE FACTUAL STATEMENTS (WHETHER TRUE OR FALSE). WRITE O BEFORE STATEMENTS OF OPINION.

F 1. "The FDA studies foods in America to check on contaminants."

F 2. "Pesticides have been banned." (FALSE STATEMENT)

O 3. "Most consumers want colorings added to processed foods."

F 4. "Sucrose, table sugar, is by far the world's most widely used sweetener."

O 5. "Sugar, honey, and other sweeteners are dangerous!"

F 6. "Carotene, a natural substance used to color margarine, adds to the nutritional value of margarine." (OUR BODIES CONVERT CAROTENE INTO VITAMIN A.)

O 7. "Most consumers want all the convenience products sold in supermarkets, even if they do contain hundreds of additives."

F 8. "Sodium nitrate and sodium nitrite, when used in meat products, are under scientific investigation."

O 9. "Using artificial sweeteners is a dangerous way to satisfy our sweet tastes."

F 10. "Benzoic acid and calcium propionate are used as food preservatives."

Review Time

What kinds of additives are there?

MATCH BY PLACING THE LETTER OF THE GENERAL TYPE OF ADDITIVE NEEDED BEFORE EACH PROBLEM DESCRIBED:

PROBLEM

B 1. To keep the cocoa from settling on the bottom of a carton of chocolate milk

K 2. To give "body" to canned pie filling

A 3. To prevent the growth of mold in mayonnaise

L 4. To keep canned potatoes from becoming mushy

H 5. To make artificial blueberries in a muffin mix look like the real thing

F 6. To make the artificial blueberries taste like the real thing

M 7. To keep baking powder from hardening into one clump

A 8. To prevent potato chips from developing a rancid taste

B 9. To keep a smooth texture in ice cream

I 10. To intensify the tart taste of a soft drink

C 11. To prevent pellagra, a disease caused by an inadequate intake of thiamin, one of the B vitamins

J 12. To make white flour with good baking qualities

E 13. To keep oil and water from separating in salad dressings

H 14. To eliminate the green tint sometimes found on tree-ripened oranges

C 15. To replace nutrients lost during food processing

ADDITIVE

A. Preservatives
B. Stabilizers
C. Nutrient Supplements
D. Alkalies
E. Emulsifiers
F. Flavors
G. Sweeteners
H. Colorings
I. Acids
J. Bleaching and Maturing Agents
K. Thickeners
L. Firming Agents
M. Anti-caking Agents

A. Carefully examine labels from at least 20 processed food products. List the ingredients found in each food item and try to categorize them according to types of additives discussed in this PAL.

ANSWERS WILL VARY.

B. Ingredients must be listed on the label in the order of amounts used. Thus, the ingredient that weighs the most must appear first, and so on. Is there any ingredient listed first or second that you found surprising? If so, why?

ANSWERS WILL VARY.

C. Do any of your labels give the reason for using an additive? If so, what are the food products, the additives, and the uses?

ANSWERS WILL VARY.

D. Calculate the percentage of the food products you examined that contained salt. Do the same for sugar. Are you surprised by the results? Why? (To determine the percentage, divide the number of products containing salt--or sugar--by the total number of products examined.)

ANSWERS WILL VARY.

E. How do you feel about the possibility that you may be eating residues of pesticides, animal drugs, industrial pollutants, or packaging materials along with your food?

ANSWERS WILL VARY.

F. Compare your family's present diet to your diet of five years ago. Do you think there is any change in the number and amount of food additives eaten? If so, are you eating more now, or less? What factors could have accounted for this change?

ANSWERS WILL VARY.

G. Ecology-minded individuals worry that the use of pesticides may harm our wildlife. Others are more concerned about the contaminants that modern farming methods may leave in our food. They promote organic farming, which does not use either chemical pesticides or fertilizers. Instead, organic farming uses biologic control of pests--such as ladybugs to control aphids--and natural fertilizers--such as human and animal wastes.[1] How do YOU feel about this issue? Read an article on farming methods and production capabilities. Discuss the ideas presented in class.

ANSWERS WILL VARY.

BEST COPY AVAILABLE

We have discussed the important roles additives play in keeping our food supply plentiful, fresh, and appealing. The use of some specific additives protects us from known deficiency diseases and perhaps other serious problems as well, such as stomach cancer.[82] But there are approximately 3000 chemicals used in food processing.[16] What about the majority of these strange-sounding chemicals--are they safe?

Many critics of food additives tend to forget that all foods are composed of chemicals. Indeed, everything made by living cells is chemical. To give you an idea just how many chemicals are found in many of our most common foods and what their names look like, try the following exercises. If you have correct answers, reading the letters down will name the primary area of concern in this section of *Eat, Drink, and Be Healthy*!

Exercises

All Foods Are Chemical

MATCH BY PLACING THE LETTER OF THE CORRECT NUMBER OF CHEMICALS BEFORE EACH OF THE FOLLOWING FOODS: [26, 47, 58]

S 1.	Coffee	F. 130
A 2.	Orange Oil	S. 350
F 3.	Potato	E. 140
E 4.	Milk	A. 42

MATCH BY PLACING THE LETTER OF THE CORRECT FOOD BEFORE EACH OF THE CHEMICAL DESCRIPTIONS: [4, 8, 25, 82] (These are just partial listings of the chemicals present in the foods.)

E 1.	Water, triglycerides of stearic, palmitic, oleic and linoleic acids; myosin and actin; glycogen, collagen, lecithin, cholesterol, dipotassium phosphate, myoglobin and urea.	T. Scrambled Eggs
A 2.	Starches, sugars, cellulose, pectin, malic acid, citric acid, succinic acid, anisyl propionate, amyl acetate, ascorbic acid, vitamin A, riboflavin, thiamine, and phosphates.	N. Onions
T 3.	Ovalbumin, conalbumin, ovomucoid, mucin, globulins, amino acids, lipovitellin, livetin, cholesterol, lecithin, lipids (fats), fatty acids, butyric acid, acetic acid, sodium chloride, lutein, zeaxanthine, vitamin A, and phosphates.	E. Beefsteak
I 4.	Caffeine, essential oils, methanol, acetaldehyde, methyl formate, ethanol, dimethyl sulfide, propionaldehyde, acetone, methyl acetate, furan, diacetyl, butanol, methylfuran, isoprene, and methylbutanol.	G. Cooking Fats and Shortenings
N 5.	Propionaldehyde, methyl alcohol, propyl mercaptan, hydrogen sulfide acetaldehyde, sulfur dioxide, dipropyl disulfide, and propyl alcohol.	A. Melon
G 6.	Triglyceride esters of palmitic, oleic, linoleic and stearic acids.	I. Coffee

Additives – Just How Much Is Used?

Chemicals are added to food in such small amounts that they cannot be measured in pounds or even grams. For this reason the abbreviations ppm, ppb, and ppt are used when discussing the amount of additives in food. PPM stands for parts per million, PPB for parts per billion, and PPT for parts per trillion. These small amounts are extremely hard to imagine, and it is just because they are so small that many people feel it is not necessary to become worried over the presence of additives in their food.

ppm
ppb
ppt

For example, BHA and BHT are preservatives commonly used in baked goods, cereals, and other foods containing fats and oils. In the average American diet, both of these antioxidants are consumed in amounts slightly less than 4 ppm--four parts per million.[18] This proportion may be easier to understand if you just consider:

- 4 PPM EQUALS ONE-EIGHTH OF ONE OUNCE FOR EACH TON OF FOOD!
- A LARGE NEEDLE IN A 1-TON HAYSTACK COULD BE 4 PPM BY WEIGHT!
- 4 PPM IN ALL THE FOOD A PERSON MIGHT EAT IN A NORMAL LIFETIME WOULD EQUAL ABOUT 4 MOUTHFULS!
- 1 PPB IS THE EQUIVALENT OF ONE INCH IN 16,000 MILES OR ONE MINUTE IN 20,000 YEARS.
- 1 PPT? IF YOU FILLED AN OLYMPIC-SIZED SWIMMING POOL WITH ICED TEA AND DROPPED ONE GRAIN OF SUGAR INTO THE POOL -- AND STIRRED THE MIXTURE THOROUGHLY -- YOU MIGHT HAVE ONE PART PER TRILLION![12,18]

In the space below, try writing one part per million, one part per billion, and one part per trillion as fractions.

$\frac{1}{1,000,000}$; $\frac{1}{1,000,000,000}$; $\frac{1}{1,000,000,000,000}$

Legislative Dilemma

Assume that you serve in the Federal Congress. You are considering the DELANEY CLAUSE in the Food and Drug Laws of this nation. You have read the PROSs and the CONs about this clause.

What would you DO??????????

ANSWERS WILL VARY.

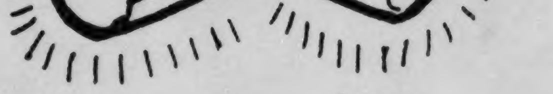
Why would you do THAT? (Give your reasons.)

ANSWERS WILL VARY.

How would you go about getting others to agree with you and vote your way in Congress? (Give your arguments and means of persuasion.)

ANSWERS WILL VARY.

Your class might stage a mock Congressional debate on the Delaney Clause today.



Open and Closed Cases

You have read about FOOD ADDITIVES on the previous pages. You have noticed the PRO and the CON sides of the arguments surrounding food additives. Some people feel that we have enough evidence from researchers. They see a CLOSED CASE--they are willing to make a judgment. Others think that the case is OPEN--we don't have adequate evidence to make a judgment.

From the material in this PAL, do you think that the case about food additives is . . . . . .OPEN . . . . or CLOSED?

WHY?

ANSWERS WILL VARY.

SOME persons will disagree with you. How can they do that? Didn't you all read the SAME EVIDENCE in this PAL?

ANSWERS WILL VARY.

Is it reasonable that good, thinking persons--reading the same evidence--will disagree on the conclusions to be drawn from that evidence?

ANSWERS WILL VARY.

Review Time

Are food additives safe?

A. CIRCLE THE LETTER OF ALL THE CORRECT MULTIPLE CHOICE ANSWERS FOR EACH OF THESE INCOMPLETE SENTENCES. (There may be more than one correct answer per question.)

1. Cyclamate, Red Dye No. 2, and saccharin are additives which

   (a) are generally recognized as safe for human consumption.
   (b) are used to preserve food.
   [✓ (c)] have been found to cause cancer in test animals.

2. In 1958, the Delaney Clause, part of an amendment to the 1938 Federal Food, Drug, and Cosmetic Act, was passed. Which of the statements below is true?

   (a) The Delaney Clause requires the FDA to thoroughly test every additive before placing it on the GRAS list.
   [✓ (b)] The Delaney Clause requires that no food additive be approved if the additive is found to induce cancer in man or animals.
   [✓ (c)] The Delaney Clause requires the FDA to ban the use of any additive found to cause cancer.

3. The GRAS list is a list of additives

   (a) which the FDA says are Generally Recognized As Suspect and may not be used for human consumption.
   [✓ (b)] which are Generally Recognized As Safe and may be used in human foods.
   [✓ (c)] which are presently undergoing an extensive review to establish their safety.

B. IF THE STATEMENT SUPPORTS THE USE OF FOOD ADDITIVES, WRITE "PRO" IN THE BLANK SPACE; IF AGAINST, WRITE "CON."

PRO 1. Additives preserve foods that otherwise would spoil.

CON 2. In a very real sense, additives cannot be tested for absolute safety. They can only be tested for the presence of known hazards.

PRO 3. Additives allow us to have out-of-season and convenience foods.

CON 4. Some additives which we consume every day have not, as yet, been proven safe for human consumption.

PRO 5. Additives are consumed in extremely small amounts.

CON 6. No one knows the long-range effects of eating additives over the length of a lifetime.

PRO 7. Newly proposed additives must undergo testing by food companies.

CON 8. Some additives once thought to be safe have been proven to cause cancer in test animals.

PRO 9. There are no harmless substances; there are only harmless ways of using substances.

CON 10. Some additives which may be potentially dangerous to humans are still used in foods today.

FIND AN ARTICLE IN A MAGAZINE OR NEWSPAPER ABOUT THE SAFETY OF A PARTICULAR FOOD ADDITIVE OR FOOD ADDITIVES, IN GENERAL. READ THE ARTICLE CAREFULLY AND ANSWER THE FOLLOWING QUESTIONS:

A. What was the main idea of the article?
ANSWERS WILL VARY.

B. How did the author substantiate his main point? (Statistics, research results, facts, opinions, etc.)
ANSWERS WILL VARY.

C. Where did the author get his information? What do you know about the author? (Education, knowledge of subject, connection to consumer group or industry, other writings, etc.)
ANSWERS WILL VARY.

D. Do you feel information as presented in this article can be accepted as factual or should be regarded as an opinion?
ANSWERS WILL VARY.

E. Have your views toward that particular additive (or towards additives, in general) been changed after reading this article? If so, in what way?
ANSWERS WILL VARY.

Additives and Advertising!

Let's consider some items which proudly advertise that additives are included in them and products that proudly advertise that they are "additive-free." Select one such food item for each category from the variety of processed food and drink which you consume. Answer the following questions, and, if possible, bring the advertisements and food products (at least, the labels) into class.

PROUD OF ADDITIVES

PROUD OF BEING ADDITIVE-FREE

NAME THE PRODUCT:

ANSWERS WILL VARY.

ACCORDING TO THE ADVERTISEMENTS FOR THE PRODUCTS:

1. WHAT SHOULD WE WANT THE PRODUCT TO DO FOR US?

ANSWERS WILL VARY.

2. WHY SHOULD WE CHOOSE YOUR PRODUCT OVER ITS COMPETITORS?

ANSWERS WILL VARY.

WHAT ARE THAT PRODUCT'S COMPETITORS?

ANSWERS WILL VARY.

Given the list of ingredients in YOUR PRODUCTS, what do you know about them? What do they do? (What purpose do they serve?)

ANSWERS WILL VARY.

IMAGINE ....

Imagine that you are going into business to introduce the following new and exciting products on the market. What--to influence potential buyers--would you call them?

* * * * * A new brand of ice cream

ANSWERS WILL VARY

* * * * * A new type of cupcake

ANSWERS WILL VARY

* * * * * A new high-fiber cereal

ANSWERS WILL VARY

* * * * * A new brand of fish cake

ANSWERS WILL VARY

* * * * * A new chocolate milk drink

ANSWERS WILL VARY

* * * * * A new powdered orange drink

ANSWERS WILL VARY

* * * * * A totally new food product

ANSWERS WILL VARY

Justify your names for the new products. Why did you select them? What was most important in the selection? What impact does each name have on potential buyers?

ANSWERS WILL VARY

Review Time

Food ads & advertising... What is the connection?

WRITE T BEFORE EACH STATEMENT THAT IS TRUE AND F BEFORE EACH STATEMENT THAT IS FALSE. CHANGE EACH FALSE STATEMENT TO MAKE IT TRUE.
(SENTENCE CORRECTIONS WILL VARY)

T 1. The book, The Jungle, described filthy conditions in meat packing plants in the early 1900's.

F 2. Because of the book, The Jungle, ~~food additives were not allowed in food until 1976.~~ (CONGRESS PASSED THE PURE FOOD AND DRUGS ACT IN 1906)

F 3. Advertisements ~~seldom~~ appeal to the public's current concerns. (OFTEN)

T 4. Some food ads today brag about how pure and natural the food is.

T 5. Advertisers sometimes use words like "rich" and "golden" to make you think of certain desirable ingredients.

F 6. An advertiser is ~~not~~ allowed to misspell words like FROOT (FRUIT) on the labels of food products. (IS ALLOWED)

T 7. Ingredients used in the processing are listed on the labels of most food products.

F 8. A box of dessert mix pictures a large strawberry on the cover. That indicates that ~~fresh strawberries should be used in preparing the food.~~ (THE FLAVORING INGREDIENTS MUST BE LISTED ON THE LABEL)

T 9. It is illegal for a box of cereal to proudly proclaim, "Just eating one bowl of this super-fortified cereal everyday will build up your natural body defenses to resist any disease!"

F 10. Organic refers to foods ~~grown in specially treated water, not soil~~. (GROWN WITHOUT THE USE OF CHEMICAL FERTILIZERS OR PESTICIDE

A. What do you think has been the most important reason for the rise in the number of "health food" stores across the nation? Is there such a store in your community? If there is, try to visit the store. Talk to the salesperson and ask if organic foods are "better for you" than foods grown by commercial methods and if so, then why. Report your findings to the class.

ANSWERS WILL VARY

B. Compare foods sold in health food stores to similar foods sold in supermarkets. Compare price, quality, variety, etc.

ANSWERS WILL VARY

C. Try to find at least three food or drink products that have misspelled words on their labels. What are the words? How do you feel about this? Should such misspellings be allowed?

ANSWERS WILL VARY; MAY MENTION FROOT LOOPS CEREAL AND VARIOUS COOKIES AND PIES WITH CREAM SPELLED WRONG AS IN OATMEAL CREME PIES AND CREME SANDWICH COOKIES.

D. Find at least 10 food or drink products with distinguishing flavors. List the flavor description on the label and the flavor ingredients shown in the ingredient listing for each product. How do they compare?

ANSWERS WILL VARY.

E. Choose a food or drink advertisement from a magazine or TV. Analyze the words used in the advertisement. What appeals do they make? Are they effective--do you want to try the product? Why?

ANSWERS WILL VARY.

F. Imagine that you have developed a "nutritious" cereal that resembles and tastes like a kind of fruit (strawberry, blueberry, apple, grape, banana, etc.). Give your product a name and write an advertisement, either for a magazine, radio, or TV to promote this product. Present your advertisement to the class for their reactions.

ANSWERS WILL VARY.

Reflecting on Government

Sure, we have a lot of food laws. But SHOULD we? Why does the government get involved in food matters? Are these the responsibility of government?

Read the following quotation from Abraham Lincoln, the 16th President of the United States:

> "THE LEGITIMATE OBJECT OF GOVERNMENT IS TO DO FOR THE PEOPLE WHAT NEEDS TO BE DONE, BUT WHICH THEY CANNOT BY INDIVIDUAL EFFORT DO AT ALL, OR DO SO WELL, FOR THEMSELVES."

Would Lincoln have supported laws regarding food additives in America? Why? Why not?

ANSWERS WILL VARY.

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Consider the following situations (many unreal!) and make a judgment as to whether government (local, state, or Federal) should be involved:

0 0 0 Mel owns a fast food shop on Route #99. He does a lot of business and never seems to have time to clean the place thoroughly. A few customers have complained about the floor, an occasional dirty dish, and the smudged counter tops.

0 0 0 Carlos has a dairy farm. Some folks like unpastuerized milk--straight from the cows. Carlos aims to please. He sells milk to those who drive up and ask to buy it.

0 0 0 Carol owns a dairy farm. She knows that Carlos--next farm over--is making money selling unpastuerized milk. People want it. So she began to make home deliveries of unpastuerized milk. Recently, she started selling it to supermarkets.

0 0 0 George Amurizio works as a chemist. Recently, he developed a really neat red dye. It makes lipstick really red, cocktail cherries brilliant, etc. He was going to market it to food processors, but the government stopped him until he did tests. George is really angry: "Isn't this a free country?"

Review Time

What is the government's role?

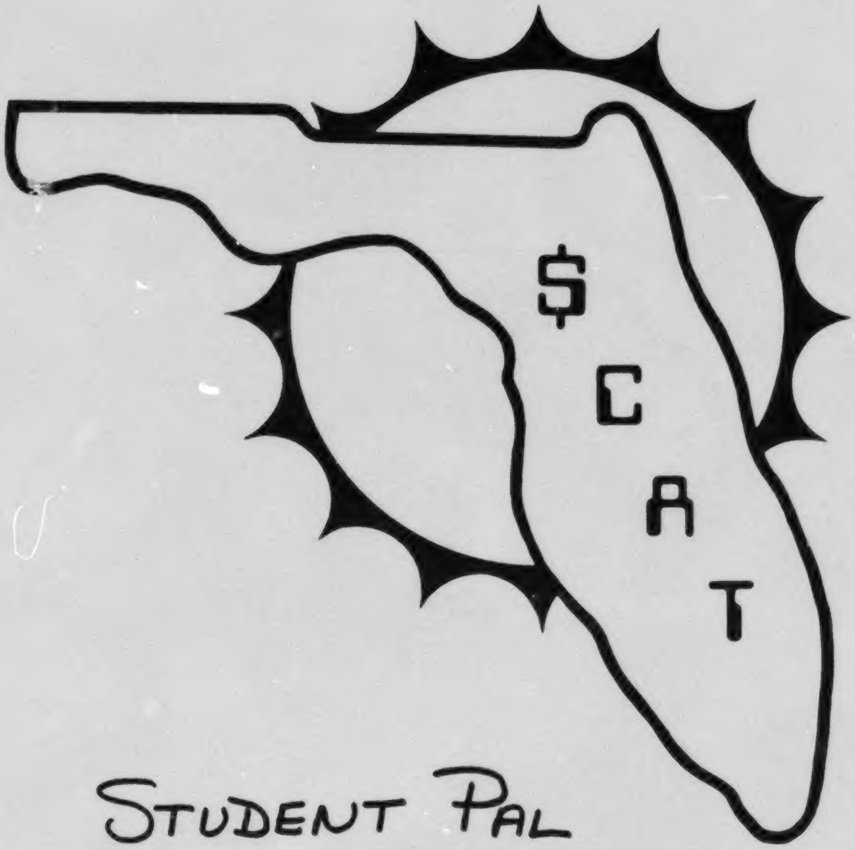
FILL IN THE BLANKS WITH A WORD OR WORDS WHICH WILL CORRECTLY COMPLETE EACH STATEMENT:

1. Consumer laws in this country are about 200 years old.
2. The FOOD AND DRUG ADMINISTRATION, FDA for short, is the agency responsible for watching our food supply.
3. The FDA is responsible only for products sold in INTERSTATE commerce.
4. When some food items on supermarket shelves contain higher than allowed levels of insect fragments, the FDA may order a RECALL of the product.
5. When writing the FDA about a problem with a food product, the consumer should also tell the manufacturer or packer and the STORE where the item was purchased.
6. When describing a problem food product in a letter to the FDA, a consumer should describe the label and any CODE MARKS that appear on the container.
7. The FDA contracts with STATE agencies to help watch over our food.
8. The controversy over nitrites is a good example of weighing RISKS against BENEFITS in determining the safety of an additive.
9. An effective way of voicing protest of a product is by REFUSING TO BUY IT.
10. LABELING READING should be an important part of food shopping trips.

A. Did you, or anyone in your family, ever buy food that turned out to be contaminated (a can of tuna that was noticeably spoiled when opened, a jar of peanut butter with visible insect fragments in it, a candy bar with a worm in it, etc.)? If so, what did you do? If such a food problem ever occurs again, what will you do about it? ANSWERS WILL VARY.

B. Assume you found a problem with some food--such as described above. Write a sample letter to the FDA describing the problem.
ANSWERS WILL VARY.

C. Look in your telephone directory for local offices of the FDA and state agencies that help protect consumers.
ANSWERS WILL VARY.



STUDENT PAL

CLASSROOM TEACHERS ARE AUTHORIZED TO
REPRODUCE THIS ORIGINAL COPY FOR USE
IN THEIR CLASSROOMS.

HEALTH SERIES
FOOD ADDITIVES

EAT, DRINK & BE HEALTHY

Richard Lipert

S — Skills For
C — Consumers
A — Applied
T — Today

© 1979 BY THE STATE OF FLORIDA, DEPARTMENT OF STATE

Be it known that this consumer education instructional unit has not been endorsed by either the Florida Department of Education or the United States Office of Education; and that the points of view or opinions expressed do not necessarily represent the official policy of these agencies.

CURRICULUM DEVELOPERS
Willie Ausherman
Judy Zieg

ILLUSTRATOR
Richard Liput

CURRICULUM CONSULTANT
Rodney F. Allen, Ph.D.

PROJECT SCAT, OSCEOLA COUNTY SCHOOL DISTRICT, P.O. BOX 1948, KISSIMMEE, FLORIDA 32741
(305) 847-3147 SUNCOM 352-7440

100

WELCOME to this PAL*, a consumer resource booklet. The two characters shown on this page are the Hazzards -- Ms. Happ and Happ Hazzard. You will find them in many of the illustrations used throughout this booklet.

Important information is divided into chapters or sections. Each section begins with a title page and includes:

PASSWORDS which give the special meanings for the words used in that section.

REVIEW TIME exercises to determine what you have learned.

Have fun, study hard, and become a conscientious consumer.

*PAL: Packaged Activities for Learning

Users of the consumer skills presented in this resource booklet come in both genders, female and male. The text and dialogues sometimes say "he," sometimes "she," sometimes "you," sometimes "the person." Please feel free to substitute the feminine for the masculine pronoun, and vice versa, any time it is appropriate to your situation.

ACACIA, ACETAL, ACETALDEHYDE PHENETHYL PROPYL ACETAL PEPITAL, ACETANISOLE, AGAR-AGAR, ALKANET ROOT

ALLSPICE, BENZALDEHYDE PROPYLENE GLYCOL ACETAL, BUTYL ANTHRANILATE

CARRAGEENAN CHONDRUS EXTRACT, CARVACRYL ETHYL ETHER, CINNAMYL BUTYRATE, DEXTROSE, CUMINALDEHYDE

EAT, DRINK, AND BE HEALTHY

It is a common saying that we are what we eat. If this is true, then Americans are becoming a nation of processed, packaged, and preserved people.

Farm-fresh foods familiar to our grandparents are more and more being substituted with foods processed in dairies, bakeries, and factories. In 1972, Americans bought more processed than fresh foods for the first time in our history.[43] We spend billions of dollars each year for processed foods. Our bill for just convenience foods such as TV dinners and other frozen items and snack foods of all kinds totals over $60 billion.[43]

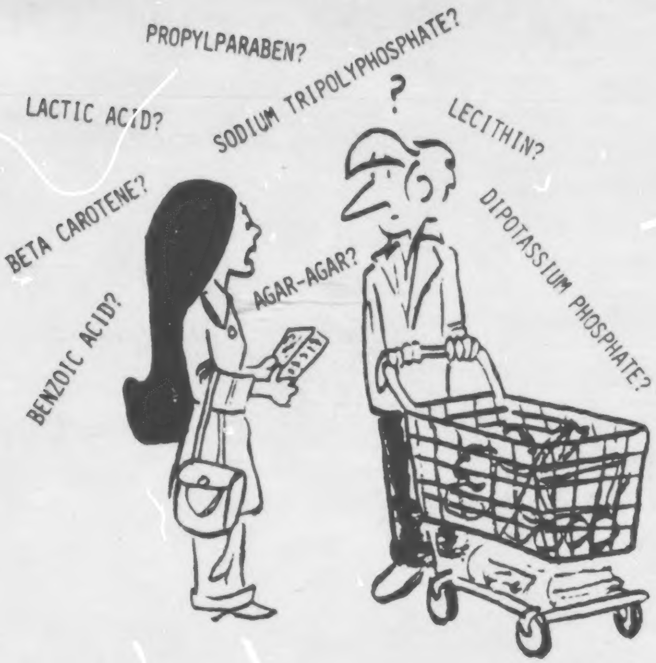
Our life styles are so different from our grandparents' that we now demand convenient food products. We have come to accept as normal:

FRESH FOODS AT ALL TIMES OF THE YEAR
FROZEN AND CANNED FOODS
HEAT AND SERVE FOODS
IMITATION FOODS
SUBSTITUTE FOODS
LOW CALORIE FOODS

Can you name other food categories? Give an example for each food category listed.

Food processing is essential for most of the food types given above and to adequately feed America's growing population. But food processing involves additives. Of the approximately 1500 pounds (682 kilograms) of food stuffs each American consumes yearly, about 139 pounds (63 kilograms) could be considered additives.[12] Sucrose (table sugar) and other sweeteners and salt account for 93 percent by weight of all food additives used in the United States.[55] We also take in about five to ten pounds (two to five kilograms) of other chemicals added to our food.[11] Over 3000 additives are now used in the manufacture of the food we eat,[16] twice as many as were used as recently as 1955.[53] Some of these additives are listed in the border around this page.[80]

DECANOIC ACID, DIHYDROCOUMARIN, FARNESOL, FUMARIC ACID, GUM GUAIAC


PROPYLPARABEN?
LACTIC ACID?
SODIUM TRIPOLYPHOSPHATE?
?
LECITHIN?
BETA CAROTENE?
AGAR-AGAR?
DIPOTASSIUM PHOSPHATE?
BENZOIC ACID?

Most of our processed foods today have labels listing ingredients such as these.

DO YOU RECOGNIZE EACH INGREDIENT YOU FIND ON YOUR FOOD PACKAGES?

DO YOU KNOW THE PURPOSE OF EACH CHEMICAL LISTED?

DO YOU THINK EACH ADDITIVE LISTED IS ABSOLUTELY SAFE?

DO YOU KNOW WHERE WE GET FOOD ADDITIVES?

Even experts cannot agree on the safety or necessity for all of the chemicals used today. All food additives should be both beneficial and safe, such as vitamins used for enrichment purposes. However, there are some additives which studies have proven to be potentially dangerous.[16]

This PAL will present additive information so that you, the consumer, can make more informed choices. Specifically, we will focus on the following questions:

1 ***What are food additives, & why are they in our food?***

2 ***What kinds of additives are there?***

3 ***Are food additives safe?***

4 ***Food ads & advertising... What is the connection?***

5 ***What is the government's role?***

What are food additives, & why are they in our food?

105 152

DICTIONARY

passwords ...

What are food additives, & why are they in our food?

ENRICH	*Add specific nutrients to a food as established in a federal standard of identity and quantity (for example: enriched bread); amounts added generally are moderate and include those commonly present at even lower levels*
FOOD	*Articles used for food or drink for humans or other animals, chewing gum, and articles used for components of any such article*
FOOD ADDITIVE	*Substance added directly to food or which may reasonably be expected to become a component of food through surface contact with equipment or packaging materials*
F.D.A.	*The Food and Drug Administration; federal agency under the Department of Health, Education, and Welfare which is responsible for the enforcement of the Federal Food, Drug and Cosmetic Act*
FORTIFY	*Add to foods specific nutrients; amounts added are usually in excess of those found normally in the food because of the importance of providing additional amounts of the nutrients to the diet*
NUTRIENT	*One of the more than 50 known elements of food which promotes body growth and development and regulates body processes*

Ready to Move On?

Do You Know the Passwords?

DEFINITIONS OF THE WORD "ADDITIVE" DIFFER FROM ONE ANOTHER, BUT EACH TELLS THE SAME STORY. READ THE FOLLOWING THREE DEFINITIONS AND THEN TRY TO WRITE A DEFINITION OF YOUR OWN, INCLUDING IDEAS FROM ALL THREE.

ad′di·tive~

Any substance the intended use of which results or may reasonably be expected to result, directly or indirectly, in its becoming a component or otherwise affecting the characteristics of any food (including any substance intended for use in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding food; and including any source of radiation intended for any such use), if such substance is not generally recognized, among experts qualified by scientific training and experience to evaluate its safety, as having been adequately shown through scientific procedures or experience based on common use in food to be safe under the conditions of its intended use.[23]

(Legal definition used by United States Food and Drug Administration)

ad′di·tive~

An ingredient that is put into food products to improve the way they taste, look, feel, or smell; to make them last longer; and sometimes to make the food better for you.[6]

ad′di·tive~

Any substance added to food either directly and intentionally for a functional purpose, or indirectly during some phase of production, processing, storage or packaging without intending that it remain in, or serve a purpose in, the final product; does not include either the basic foodstuff itself or chance contaminants.[25]

MY DEFINITION:

THERE ARE TWO BROAD TYPES OF ADDITIVES:

Intentional Additives: substances purposely added to perform specific functions.[26]

Incidental Additives: substances which may be present in the finished food in trace quantities as a result of some phase of production, processing, storage, or packaging.[25]

WHY ADDITIVES ?

1 IMPROVE NUTRITIONAL VALUE

The idea that food is important to health can be traced as far back as Hippocrates in the year 400 B.C.[25] Through the years scientists have studied the relationship of diet to health. They have learned that an adequate intake of nutrients is necessary to maintain a healthful body.

Nutrition research has identified key nutrients. Enrichment and fortification measures used today to protect Americans from deficiency diseases such as rickets, goiter, and pellagra involve adding the necessary nutrients to our foods.[25]

2 ENHANCE ACCEPTABILITY

Additives make food taste better. No matter how "natural" your diet, if you use salt, pepper, baking soda, sugar, mustard, or other condiments, you're using food additives.

The importance of the flavor of food cannot be overestimated. If if lacks good flavor, food often will go uneaten--regardless of its nutritional value. Therefore, homemakers, as well as the food industry, use flavoring agents to make food taste better.[25]

3 IMPROVE THE QUALITY

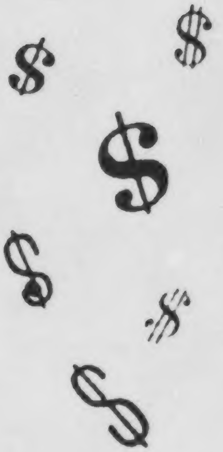
Many people can still remember when peanut butter separated, bread dried up in two days, and marshmallows got too hard to toast. Sure, we can get along without food additives, if we don't mind seeing our cakes go stale or mold overnight, our salad oils turning rancid, and our table salt becoming hard and lumpy. Without additives, the variety and quality of our foods would return to those familiar to grandmother.[18]

In fact, without food additives, there would probably be no need for supermarkets. The vast majority of the 8,000 items on sale today could not exist without one or more added chemicals.[9]

4 MAKE FOOD MORE AVAILABLE

Food additives keep foods fresh during their long trek from producer to consumer and provide a variety of foods the year round. In our society, 92 percent of the population is dependent on the remaining eight percent to produce all its food.[9] Without food preservation methods, most of the world's population would be faced with a "feast or famine" situation. We would have a large volume and varied selection of foods only during a short harvest period. Most of the year we would be limited to eating only staples such as grains and a few root crops.[45]

5 REDUCE COSTS



Additives have helped reduce the cost of food. Without added preservatives, many foods would have to be purchased in small quantities because they would spoil quickly. You would have to shop more often. Since waste due to spoilage would be extensive, food would cost more.[8] The cost of an additive usually adds very little to the final cost of a food. For example, enough calcium propionate to help protect 1,000 loaves of bread from becoming moldy costs less than ten cents.[18]

Consumerists have charged that sometimes food companies use additives to increase their profits. One way is by substituting an inexpensive ingredient, possibly a synthetically produced flavoring, for an expensive ingredient, the "real thing."[13] Another way is by raising prices higher than the additional cost incurred for "super" vitamin-fortified foods.[11]

6 FACILITATE FOOD PREPARATION

We live in a "heat and eat" society where eating on the run is often the rule. Fast food restaurants and pop-em-in-the-oven foods are greatly desired by many of today's consumers. Without additives, there would be few convenience foods--no canned fruits or vegetables, packaged soups, bread or cakes, pancake mixes or syrups, soft drinks, TV dinners, or frozen pizzas.[9]

WHERE DO ADDITIVES COME FROM?

Many food additives come from NATURAL sources.[26] For example, lecithin is found in all living organisms, both plant and animal. Lecithin is obtained primarily from soybeans and is useful as an emulsifier to keep ingredients in a processed food from separating.[18] Annatto, a naturally-occurring yellow dye, is occasionally used to color various foods.[26] Papain, used in meat tenderizers, is a natural plant enzyme.[61]

Other food additives, however, are CREATED in laboratories, by food scientists, to answer special problems. Often, the manufactured additives are essentially the same as those found naturally in food. For instance, Swiss cheese naturally contains propionates, substances used in certain foods--such as bread--to help retard mold.[25] Vitamins and minerals used to improve nutritive value are other examples. Synthetic nutrients are identical in composition to the vitamins and minerals found naturally in food. However, the synthetics are less expensive and more available.[26]

Manufactured additives have the advantages of being more concentrated, freer of objectionable impurities, and more consistent in quality than the natural products.[26]

In some cases, an additional amount of a chemical already present in a food is needed. One example is found in the processing of evaporated milk. Milk from different herds and at different seasons of the year may have varying amounts of certain mineral salts. Because the proportion of these salts affects the heat stability of the milk, it is sometimes necessary to add additional quantities of one or more of them in order to produce a uniform product.[25]

Although manufactured additives are frequently and sometimes critically called "chemicals," they are no more so than those made by nature. All additives, whether from natural or other sources, are "chemicals." Indeed, everything in the world is essentially chemical--from the flooring in your home to the vitamins in your food to the components of your body![26]

Food additives - who wants them?

Basically, the use of additives is a response by the food industry to the changes in food consumption patterns that have taken place in the past 100 years. Most consumers no longer grow their own food or spend hours in the kitchen preparing all their meals from "scratch." Also, consumers have a low tolerance for food that spoils quickly.

But additives are also used to make food as we "think" it should be. Consider the following examples:

. . . . "I WILL NOT BUY AN ORANGE UNLESS IT LOOKS LIKE AN ORANGE! ALL THE PICTURES I'VE EVER SEEN OF ORANGES SHOW LOVELY ORANGE-COLORED ORANGES. (I'VE NEVER SEEN A REAL ORANGE TREE.) I DEMAND ORANGE ORANGES."

So, processors respond by coloring naturally colored oranges ORANGE to suit my demands and to get my consumer dollar.

Should I now complain about coloring on my oranges?

WHY? WHY NOT?

. . . . "LOOK AT THAT LUSCIOUS-LOOKING CANDY BAR! SUCH A GLOSSY, LUSTROUS COATING OF CHOCOLATE!"

Of course, that chocolate candy bar would take on a mottled or cottony look when left at room temperature if the candy manufacturer did not add an emulsifier to keep the fat and cocoa butter from separating. I probably wouldn't buy a candy bar like that.

Should I now complain that the candy bar is not "real" chocolate?

WHY? WHY NOT?

. . . . A maker of "all natural" ice cream points out, "CUSTOMERS COMPLAIN ABOUT THERE NOT BEING ANY GREEN IN OUR CHOCOLATE CHIP MINT FLAVOR. BUT PURE MINT IS CLEAR, NOT GREEN, AND OUR 'NATURAL' PRODUCT DOESN'T SELL AS WELL AS OTHER COMPANIES', WHICH ARE A BIT LESS NATURAL AND A LOT MORE COLORFUL."

Should I complain about such food items?

WHY? WHY NOT?

Review Time

What are food additives, & why are they in our food?

NAME THE TYPE OF ADDITIVE--INTENTIONAL OR INCIDENTAL--ILLUSTRATED IN EACH OF THE FOLLOWING:

__________________ 1. Milk which has been fortified with Vitamin D to prevent rickets, a childhood disease in which bones are not formed properly

__________________ 2. Small amounts of cellophane that migrate from the packaging to the food

__________________ 3. Residues of chemicals used to kill insects and weeds found in grains after harvesting

__________________ 4. Low-calorie food items made with an artificial sweetener instead of sugar

A. Name ten foods you have eaten in the past week which contained intentional additives.

B. Name ten foods you have eaten in the past week which did not contain intentional additives.

C. Which of the above lists was the easier to do? Why do you think this is so?

D. What do you consider to be the most important reason for using additives in processing food? Why?

E. How could food additives be used in ways harmful to consumers?

F. A consumer activist group has charged that one cereal company adds about a penny's worth more vitamins to one of its cereals. However, that "super-fortified" cereal costs about 30 cents more in the grocery store than the original cereal.[11] What do you think about this? Could this happen? If so, are there any other factors that could affect the price increase other than the cost of the additional vitamins? Can you name two cereals that seem to be essentially the same, except that one cereal is advertised to be "loaded" with vital vitamins and minerals and costs more than its "look-alike" without the extra nutrients?

What kinds of additives are there?

DICTIONARY

passwords . . .

What kinds of additives are there?

ACIDS	*Food additives used to intensify the flavor of foods*
ALKALIES	*Food additives used to neutralize excess acidity*
ANTI-CAKING AGENTS	*Food additives used to keep powders, salts, and sugar free-flowing*
ANTIOXIDANTS	*Food preservatives used to prevent undesirable changes in color or flavor caused by oxidation*
BLEACHING AGENTS	*Food additives used to whiten foods, such as flour or certain cheeses*
COLORINGS	*Food additives used to improve a food's normal appearance by changing the color*
CONTAMINANTS	*Undesirable substances that may enter food*
CURING AGENTS	*Food additives used to preserve meat*
EMULSIFIERS	*Food additives which help combine ingredients which normally don't mix well together*
FIRMING AGENTS	*Food additives which keep fruits and vegetables from becoming soft while being processed*
FLAVORING AGENTS	*Food additives used to enhance the natural flavor of foods*
FLAVORS	*Food additives used to add distinctive tastes to foods*
FOAMING AGENTS	*Food additives used to control the foaming, or whipping, qualities of foods*

HUMECTANTS	Food additives used to keep moisture in certain foods
INHIBITORS	Food preservatives which delay or prevent the growth of mold, bacteria, or yeast which spoil food
INCIDENTAL ADDITIVES	Food additives which may be present in the finished food in trace quantities as a result of production, processing, storage, or packaging
INTENTIONAL ADDITIVES	Food additives purposely added to perform specific functions
LEAVENING AGENTS	Food additives used to lighten the texture of certain foods, such as baked goods
MATURING AGENTS	Food additives used to age flour and improve the baking qualities
NUTRIENT SUPPLEMENTS	Food additives used to increase food value
PRESERVATIVES	Food additives which extend the life of food
PROCESSED FOODS	Foods no longer in the same form as when they were harvested
RANCID	Having a rank smell or taste
SEQUESTRANTS	Food preservatives used to separate traces of substances which might interfere in the processing
SOLVENTS	Food additives used as carriers for other additives or ingredients
STABILIZERS	Food additives which keep solids and liquids from separating
SWEETENERS	Food additives used to give a sweet taste to foods
THICKENERS	Food additives used to provide consistency and "body" to many foods

Ready to Move On ?

Do You Know the Passwords ?

A trip to the supermarket is enough to convince us that processed foods make up the majority of the foodstuffs we buy and eat today and that the number of such foods is growing. Just think of all the "new" products that have been placed in supermarkets in the past few years. You and your family are possibly eating more processed foods today than you did just ten years ago. The processed foods market is growing and is expected to reach $150 billion in 1980, almost double the $80 billion in 1967.[62]

Additives make most of these processed foods possible, and there are about 3000 additives in use today.[6] It would be impossible to study each additive in this PAL, but it is useful to understand what different types of additives there are.

MOST OF THE INTENTIONAL ADDITIVES IN USE TODAY CAN BE CLASSIFIED INTO THESE GENERAL CATEGORIES:

Acids and Alkalies

Stabilizers and Thickeners

Nutrient Supplements

Flavors and Flavoring Agents

Preservatives

Bleaching and Maturing Agents

Colorings

Emulsifiers

Sweeteners

Acids and Alkalies

Acids, mainly the acids found naturally in fruits, are used in many products to intensify flavor. CITRIC ACID accounts for 60 percent of all acid additives.[4] It is used in many different foods--such as fruit juices, canned potato soup, frozen turnovers, toaster pastries, lemon flavored pie filling, and cheese spreads. Other acids--such as PHOSPHORIC, FUMARIC, ADIPIC, MALIC, TARTARIC, and LACTIC are found in many items, and each has its special characteristics. For example, an acid may be selected or rejected on its ability to absorb moisture, dissolve in water, or intensify flavor.[4]

The alkalies are used to neutralize excess acidity in products. This will also improve flavor and lengthen shelf life. AMMONIUM BICARBONATE is used in frozen coconut cream pies and chocolate eclairs. SODIUM CARBONATE and CALCIUM CARBONATE are alkalies used to reduce the acidity of wines, canned peas, and olives.[4]

Leavening Agents

One of the most important uses of additives is as leavening agents, substances used to make foods light in texture. Without acids and alkalies that make up baking powder and baking soda, we would not have the variety of cakes, waffles, muffins, and other baked foods we so enjoy today.[25]

Stabilizers and Thickeners

For centuries certain gums extracted from trees, seeds, and seaweeds were used to thicken foods or stabilize them by keeping the solids and liquids from separating. Most stabilizers and thickeners used today are from plants. If chocolate milk did not contain a stabilizer the chocolate would settle on the bottom of the container. DEXTRIN is a stabilizer used in beer to make the "head" last longer. Stabilizers in ice cream prevent it from becoming "sandy" or "grainy" and give it a smooth creamy texture. CARRAGEENAN appears to be the most widely used stabilizer, being used in chocolate milk, syrups for frozen products, evaporated milk, instant diet breakfasts, pressure-dispersed whipped cream, and cottage cheese.[4]

Thickeners provide consistency and "body" and are found in icings, cheese spreads, salad dressings, pie fillings, soups, gravies, soft drinks, ice cream, puddings, and many other foods. GUM ARABIC is a widely used thickener.[4] Some of the thickeners used commercially to process food are also used in the home kitchen. PECTIN and GELATIN are two examples.[25]

Nutrient Supplements

Food processors go to considerable lengths to conserve the nutrients present in the natural foods. However, some nutrients are still lost during processing.[1] Nutrient supplements are needed to replace the destroyed vitamins and minerals. Foods containing such supplements are labeled "enriched." Examples include bread and other baked goods, as well as noodles, spaghetti, and similar products. Unfortunately, enrichment does not always replace all the lost nutrients.[50]

Nutrient supplements are also added to increase a food's nutritive value. These may be nutrients that do not occur naturally in the food or are present in a very low level. For instance, milk is "fortified" with vitamin D. POTASSIUM IODIDE is added to salt to furnish the iodine necessary to prevent goiter.[18] Other fortified products include breakfast cereals and imitation fruit drinks.[50]

However, vitamins are not always added to food just to increase food value. They may be added for other reasons. For instance, vitamin C (ASCORBIC ACID) is often used to keep fruits from discoloring. Vitamin E (TOCOPHEROL) may be added to prevent oily foods from becoming rancid.[65]

Flavors and Flavoring Agents

This is by far the largest and most diversified group of food additives.[25] We are all familiar with the effects of many common flavorings and spices such as onion, garlic, cloves, and peppermint. Natural flavorings, however, are becoming a thing of the past as our demand for flavorings grows. For example, there is not enough natural vanilla in the whole world to flavor the ice cream we consume during a year in the United States,[82] and VANILLIN, a synthetic flavoring, is used. Other synthetic flavorings include AMYL ACETATE for banana, ALLYL CAPROATE for pineapple, CINNAMALDEHYDE for cinnamon, and PHENYLETHYL ISOVALERATE for peach. The list could go on and on since there are approximately 1600 synthetic flavorings.[6]

Industry often prefers using the synthetic flavorings instead of the natural ones for many reasons. Most artificial flavorings cannot be told from the natural flavorings. They have the added advantages of being cheaper and available year round.[4] Synthetic flavorings also are consistent in their flavoring qualities. Artificial flavorings may survive processing better than natural flavorings.[25]

Some agents simply enhance food flavor. They do not add flavor themselves but bring out the natural flavor of the food. MONOSODIUM GLUTAMATE (MSG) is a flavoring agent widely used in meats, soups, gravies, and some vegetable products.[70]

Preservatives

These are probably the oldest class of food additives known to man. Even the ancient Egyptians preserved many kinds of fish by salting them. Preservatives include a variety of substances which are used to maintain appearance and good taste and increase the safety or shelf life of foods. Different types of preservatives are used for protecting foods from particular spoilage problems.

Antioxidants

Antioxidants prevent the undesirable change in color or flavor caused by oxygen in the air. We have all watched a peeled peach or apple turn brown, but dipping the fresh fruit in lemon, orange, or pineapple juice will prevent that browning. Similiarly, the addition of ASCORBIC ACID prevents that problem in commercial canning and freezing.[25]

Oxidation can also cause the rancid taste and odor that sometimes develop in fats and oils. Food processors most often use BHA and BHT to control rancidity in foods containing fats or oils, such as cereals, margarine, potato chips, cake mixes, crackers, soups, lard, and shortenings.[4]

Inhibitors

Inhibitors delay or prevent the growth of mold, bacteria, or yeast which spoil food. Some of the substances used to prevent such spoilage have been used for centuries. Good examples are common table salt and sugar.[25] CALCIUM PROPIONATE and SODIUM PROPIONATE are often used as mold inhibitors in bread and other baked goods. SORBIC ACID is used in cheese, syrups, pie fillings, jams, mayonnaise, fruit juices, and many other products. Another preservative commonly used is BENZOIC ACID, often used in carbonated beverages and other products with a high acid content.[4]

Sequestrants

The word "sequester" means to separate. Thus, this group of additives aid in food processing by setting apart or separating traces of substances which otherwise might interfere in the processing.[25] For instance, CITRIC ACID is used by beverage industries to prevent clouding in what should be clear soft drinks.[50]

Spoilage can be prevented or retarded not only by additives, but also by the processing method used. Heating, refrigeration, drying, freezing, fermenting, and and curing can all help preserve food.[14]

Bleaching and Maturing Agents

Wheat flour in its natural, freshly-milled state has a pale yellowish color. and lacks qualities necessary to make an elastic, stable dough. However, during storage, flour slowly becomes white and undergoes a maturing, or aging, process that improves its baking qualities. About 50 years ago it was discovered that certain agents added to the flour would accelerate this process and thus reduce storage time and associated costs.[83]

Bleaching agents make flour white by oxidizing the colored matter. Some substances, such as BENZOYL PEROXIDE, simply bleach the flour without any effect on its baking qualities. Other additives, such as CHLORINE DIOXIDE, NITROSYL CHLORIDE, and CHLORINE have both a bleaching and maturing, or "improving" ability.[83]

Bleaching agents also have specialized uses outside of the baking and milling industries. Cheese processors add bleaching agents to produce traditionally white cheese, such as Blue cheese. Bleaching agents are also used to help neutralize color naturally present in fats and oils.[25]

Colorings

Of all the types of additives, colorings are probably the ones that consumers could most easily do without. They contribute nothing to the quality of the food. Nor do they help it to stay fresh longer. However, the color of a particular food may determine our acceptance of it. We are so used to certain colors in specific foods that we might refuse to buy them if the colors varied.

It's true that tests have shown that a food's color does affect a person's desire to eat it.[68] If you don't think that's so, then think about spreading blue butter on your toast, or drinking a glass of red milk. Likewise, yellow tomatoes and yellow watermelons, both good varieties, have little market value because of their color.

Colorings are widely used in many food products, particularly soft drinks, candy, frozen desserts, gelatin desserts. puddings, maraschino cherries, meat casings, prepared mixes, and some dairy and bakery products.[25] Without color additives, many of these products may not be acceptable to consumers.

No coloring, though, can be used to conceal blemishes or inferiority or to mislead the consumer in any way. For example, the spice SAFFRON, which gives an egg color, could not be used to make consumers think they were buying an egg-rich product.[27]

Some food colors come from natural sources. CAROTENE, found in carrots, is often used to color margarine.[25] However, 90 percent of the colors used in processed foods are manufactured.[6] The chemical names of colors are extremely long and are usually simply identified as FD&C BLUE #1 and FD&C YELLOW #5.

Emulsifiers

Emulsifiers permit the dispersion of tiny globules of one liquid in another liquid. A good example is an oil and vinegar salad dressing. The two ingredients will begin to separate as soon as mixing stops. However, with the addition of an emulsifier, the ingredients stay combined long after mixing stops.[25]

Emulsifiers also prevent separation occuring in peanut butter, chocolate, margarine, and ice cream and play important roles in the baking industry. Emulsifiers improve bread characteristics such as volume, uniformity, and fineness of grain as well as make batters and doughs easier to handle.[25]

Among the most widely used emulsifiers are the natural substance LECITHIN and the man-made substitutes MONOGLYCERIDES and DIGLYCERIDES. You'll find them listed on hundreds of food packages, products ranging from whipped desserts to instant potatoes.[4]

Sweeteners

Ever since man first tasted honey, he has liked sweet-tasting foods. He satisfied his desire for a sweet taste primarily by sugar until the latter part of the 19th century. Although over 100 substances are classified chemically as "sugars," only one is by normal use called SUGAR. This is the natural sweetener called SUCROSE which comes from both sugar cane and sugar beets.[4]

SUCROSE is by far the world's most widely used sweetener. The food industry alone uses about seven million tons of it a year. Each person in the United States, on the average, eats about 100 pounds (46 kilograms) of the sweet stuff each year![4] Another widely used sweetener is CORN SYRUP. Each American eats about 30 pounds (13½ kilograms) of it each year.[7]

Sweeteners, however, are high in calories. SUCROSE contains about four calories per gram, or 18 calories per teaspoon, or 120 calories per ounce, or 1920 calories per pound.[4] Simple arithmetic shows you that the average American takes in about 12,000 calories each year just from simple table sugar--possibly too much for many overweight Americans. Therefore, non-nutritive, or non-caloric, sweeteners may be of great benefit to such people. Sugar substitutes add only sweetness to food, not calories, and include substances such as SACCHARIN. However, the safety of non-nutritive sweeteners has been questioned in recent years. One synthetic, CYCLAMATE, has already been banned.[79]

Sweeteners are used for more reasons than simply to add to the taste of foods. SUCROSE can contribute body to a variety of beverages, tenderness to baked goods, or color when caramelized. If enough is used, sugar can even preserve food.[4] Sweeteners are added to many types of food products. Obviously sweetened foods include soft drinks, jellies, candies, and ice cream. But sweeteners are also added to hot dogs, crackers, bread, salad dressings, and even bouillon cubes.[78]

Most people may be shocked to discover just how much sugar is really added to many foods we buy and eat. Researchers at Houston's VA Hospital determined the concentration of sugar, particularly sucrose and glucose, of more than 1000 food and drink items. Some of the findings are shown on the right. The number after each item is the percentage of sugar in it.[60]

Eskimo Pie	21.8
Nabisco Wheat Thins	5.2
Instant Chocolate Mix	86
Tomato	6
Lifesavers-Cherry Sours	81.6
Clorets	83.4
Nabisco Graham Crackers	18.0
All-Bran Cereal	21.6
Vanilla Ice Cream	10.5
Certs-Wintergreen Flavor	91.
Beech-Nut Fancy Fruit Gum	71.4
Heinz Baby Custard Pudding	9.1
Fresh Pineapple	9.9
Space Food Sticks	41.6
Luden's Wild Cherry Cough Drops	57.8
Chocolate Filled Cupcake	36.7
Cream Filled Twinkie	38.8
General Mills Vanilla Breakfast Squares	40.4
Corn Flakes (Kroger)	6.6
Carnation Granola Breakfast Bar With Cinnamon	23.1
Vicks Medicated Cough Drops Regular Flavor	13.5
Gerber Plums With Tapioca Baby Food Dessert	18.3

Read Food Labels! If sugar is listed as the first or second ingredient, the sugar content is high. Each type of sweetener can be listed separately. Also look for corn syrup, corn sugar, fructose, and glucose. They also mean a form of SUGAR![60]

Additives — used for still more purposes

Firming Agents

Some fruits and vegetables tend to soften when they are heated for canning or bottling. Firming agents prevent that problem. CALCIUM SALTS are used in the processing of peas, potatoes, pickles, cherries, apples, and tomatoes.[4]

Anticaking Agents

To keep salt, sugar, and other powders free-flowing, anti-caking agents are added. This is usually accomplished with a little SODIUM SILICO ALUMINATE or, as in the case of garlic salt, a little CALCIUM STEARATE. One powdered orange drink has CALCIUM PHOSPHATE in it to keep the powder dry and free-flowing.[4]

Humectants

These additives are used to help keep moisture in certain foods. For instance, PROPYLENE GLYCOL is an additive that permits ready-shredded coconut to remain moist, soft, pliable, and fresh-tasting, not dry and tasteless. GLYCERINE is added to marshmallows and certain confections.[illegible]

Curing Agents

These agents were originally used to preserve meat. SALT and other compounds are still important in the curing process. SODIUM NITRITE and SODIUM NITRATE are used in the curing of meats such as bacon, ham, bologna, and frankfurters to develop and stabilize the pink color associated with these products, as well a inhibit the growth of deadly botulism germs.[70]

Foaming Agents

In order for pressure-packed whipped toppings to "squirt" fully-whipped from their containers, foaming (or whipping) agents are used. An example is NITROUS OXIDE, used as a propellant in dairy and vegetable-fat toppings.[70] On the other hand, some foods produce unwanted foaming, and foam inhibitors are needed to prevent foaming. For example, the foam on beverages may make it difficult to completely fill containers. The addition of MONO- or DIGLYCERIDES prevents the foaming and enables the consumer to buy full measures.[70]

Solvents

These additives are used in some foods as carriers for other additives or ingredients.[25] PROPYLENE GLYCOL is used as a flavor and color solvent.[70]

Incidental Additives

Food additives, then, may be intentionally added to foods for any one of a number of purposes. However, there are also substances that have no planned function in food but become (or have a reasonable possibility of becoming) part of it during some phase of processing, packaging, or storing.[56] These INCIDENTAL ADDITIVES can get into food anywhere along the way from field to farmer to consumer and number some 10,000 known chemicals.[36]

Agricultural Chemicals

These are various types of chemicals used to increase food production. Fertilizers are applied to land to maximize yields. Pesticides are used to control pests such as weeds, insects, and fungi. They control the 50,000 known plant diseases and 6500 insects known to infect plants and animals.[66] Some of these chemicals do remain with the plants after harvesting. Others may be retained when the crops grown for animal feed are eaten by livestock and poultry.[2]

Antibiotics, hormones, and other drugs are used to treat animal diseases or to make hogs, poultry, and cattle grow faster. Such drugs play a major role in meat and poultry production. In fact, 80 percent of all the meat and poultry consumed in the United States comes from animals that were given drugs in their feed at some time in their life.[80] Rough estimates by food experts place the loss of poultry, beef, and dairy animals, if not given any drugs, at one-half of the present production.[66]

FACTORY INC

Industrial Pollutants

Industrial waste products may show up as a residue in our food. For example, industry may discharge wastes into nearby streams. This can result in high concentrations of the pollutant, such as mercury, in fish and shellfish living in those waters.[46]

Packaging Materials

Other incidental additives can migrate into foods from the packaging--such as metal fragments, a variety of plastics, paper and cardboard fillers, and glue and adhesives.[66]

Keeping Foods Clean

Some breakfast cereals are packaged with nifty little surprises packed inside. Most other foods are not, but sometimes "surprises" can sneak into foods. These unwanted ingredients are known as chance contaminants, or filth.

Filth

Filth may be hairs, feathers, fragments, eggs, and excreta from birds, insects, rodents or other animals; various molds; decomposition or rot of the food product; and dirt, sand, or rocks. Other contaminants may include materials purposefully added to deceive the consumer, such as substances added to increase the weight of the food.[54]

Few of us would willingly buy and eat contaminated foods. But unless you want to stop eating completely, it is impossible to avoid all food contaminants. Modern processing methods make our food as free as possible from filth. However, some foods are so naturally susceptible to contaminants that you cannot totally eliminate them. One example is a microscopic scale insect that grows on peppercorns. Current processing methods cannot effectively remove it from pepper before grinding. We, therefore, have two alternatives: either tolerate it or go without ground black pepper.[22]

Other types of contamination, however, are quite avoidable. A high level of filth may result from using infested raw materials. Rat excreta or roach fragments in food could mean improper storage or manufacturing practices.[22] Food is not always safe in our homes, either. We may be careless about our storage, cooking, and serving procedures.

UNDESIRABLE CONTAMINANTS MAY ENTER FOOD IN THE FIELD, DURING PROCESSING, OR DURING STORAGE. TO KEEP CONTAMINANTS AT A MINIMUM ACCEPTABLE LEVEL, THE FDA, IN A CONTINUING STUDY CALLED THE TOTAL DIET SURVEY (SOMETIMES REFERRED TO AS MARKET BASKET SURVEY), EXAMINES OUR FOOD AND DRINK FOR RESIDUES OF PESTICIDES, HEAVY METALS, AND INDUSTRIAL CHEMICALS.[37] IN ADDITION, TO KEEP FILTH AT A MINIMUM, THE FDA REGULARLY MAKES INSPECTION OF PROCESSING AND STORAGE FACILITIES FOR FOODS IN INTERSTATE COMMERCE AND TAKES ACTION AGAINST ANY FOOD PROCESSOR OPERATING UNDER INSANITARY CONDITIONS.[54] STATE AGENCIES ALSO HELP IN THE FIGHT TO KEEP OUR FOODS CLEAN.

DISTINGUISHING FACT AND OPINION

In a discussion we hear people make statements which they want us to accept as TRUE! They want us to believe something. To know if we should accept what they tell us, we first have to know if they are making a statement which is a fact or an opinion. Look at these two examples:

1. Nuclear energy is very dangerous as a way to get electric power.

2. Nuclear generating plants are being constructed, today, in every region of the United States.

The first statement offers us an interpretation of the facts. It is a statement of OPINION. The second statement offers us a factual assertion (whether it is true or false is another matter).

READ THE FOLLOWING STATEMENTS. WRITE F BEFORE THOSE WHICH ARE FACTUAL STATEMENTS (WHETHER TRUE OR FALSE). WRITE *O* BEFORE STATEMENTS OF OPINION.

_____ 1. "The FDA studies foods in America to check on contaminants."

_____ 2. "Pesticides have been banned."

_____ 3. "Most consumers want colorings added to processed foods."

_____ 4. "Sucrose, table sugar, is by far the world's most widely used sweetener."

_____ 5. "Sugar, honey, and other sweeteners are dangerous!"

_____ 6. "Carotene, a natural substance used to color margarine, adds to the nutritional value of margarine."

_____ 7. "Most consumers want all the convenience products sold in supermarkets, even if they do contain hundreds of additives."

_____ 8. "Sodium nitrate and sodium nitrite, when used in meat products, are under scientific investigation."

_____ 9. "Using artificial sweeteners is a dangerous way to satisfy our sweet tastes."

_____10. "Benzoic acid and calcium propionate are used as food preservatives."

Review Time

What kinds of additives are there?

MATCH BY PLACING THE LETTER OF THE GENERAL TYPE OF ADDITIVE NEEDED BEFORE EACH PROBLEM DESCRIBED:

PROBLEM

_____ 1. To keep the cocoa from settling on the bottom of a carton of chocolate milk
_____ 2. To give "body" to canned pie filling
_____ 3. To prevent the growth of mold in mayonnaise
_____ 4. To keep canned potatoes from becoming mushy
_____ 5. To make artificial blueberries in a muffin mix look like the real thing
_____ 6. To make the artificial blueberries taste like the real thing
_____ 7. To keep baking powder from hardening into one clump
_____ 8. To prevent potato chips from developing a rancid taste
_____ 9. To keep a smooth texture in ice cream
_____10. To intensify the tart taste of a soft drink
_____11. To prevent pellagra, a disease caused by an inadequate intake of thiamin, one of the B vitamins
_____12. To make white flour with good baking qualities
_____13. To keep oil and water from separating in salad dressings
_____14. To eliminate the green tint sometimes found on tree-ripened oranges
_____15. To replace nutrients lost during food processing

ADDITIVE

A. Preservatives
B. Stabilizers
C. Nutrient Supplements
D. Alkalies
E. Emulsifiers
F. Flavors
G. Sweeteners
H. Colorings
I. Acids
J. Bleaching and Maturing Agents
K. Thickeners
L. Firming Agents
M. Anti-caking Agents

A. Carefully examine labels from at least 20 processed food products. List the ingredients found in each food item and try to categorize them according to types of additives discussed in this PAL.

B. Ingredients must be listed on the label in the order of amounts used. Thus, the ingredient that weighs the most must appear first, and so on. Is there any ingredient listed first or second that you found surprising? If so, why?

C. Do any of your labels give the reason for using an additive? If so, what are the food products, the additives, and the uses?

D. Calculate the percentage of the food products you examined that contained salt. Do the same for sugar. Are you surprised by the results? Why? (To determine the percentage, divide the number of products containing salt--or sugar--by the total number of products examined.)

E. How do you feel about the possibility that you may be eating residues of pesticides, animal drugs, industrial pollutants, or packaging materials along with your food?

F. Compare your family's present diet to your diet of five years ago. Do you think there is any change in the number and amount of food additives eaten? If so, are you eating more now, or less? What factors could have accounted for this change?

G. Ecology-minded individuals worry that the use of pesticides may harm our wildlife. Others are more concerned about the contaminants that modern farming methods may leave in our food. They promote organic farming, which does not use either chemical pesticides or fertilizers. Instead, organic farming uses biologic control of pests--such as ladybugs to control aphids--and natural fertilizers--such as human and animal wastes.[1] How do YOU feel about this issue? Read an article on farming methods and production capabilities. Discuss the ideas presented in class.

Are food additives safe?

176

129

DICTIONARY

passwords . . .

Are food additives safe?

BAN	*Prohibit the use*
CON	*An argument against something or someone*
DELANEY CLAUSE	*Part of the 1958 Food Additives Amendment; named after a New York congressman, the clause states that any additive which is found to induce cancer when ingested by man or animal may not be used in food for humans in any amount at all*
FOOD ADDITIVES AMENDMENT	*Prohibits the use of new food additives until sponsor establishes safety and FDA issues regulations specifying the conditions of use*
GRAS LIST	*The FDA's list of substances Generally Recognized As Safe; excluded from the provisions in the Food Additives Amendment*
PPM	*Parts per million; a unit for measuring the presence of additives in food*
PRO	*An argument for, or in favor of, something or someone*
SYNERGISTIC	*Refers to the cooperative action of substances, which, when combined, have a total effect which is greater than the sum of the effects taken separately*
TOXIN	*Poison*

Ready to Move On ?

Do You Know the Passwords ?

Foods Contain Natural Toxins

Not all chemicals found naturally in our food are totally safe for human consumption. Our food supply contains a variety of substances which are potentially harmful if eaten often and in very large amounts. Here are a few examples:

DANGEROUS CHEMICAL	SOURCE
OXALIC ACID (MORE FAMILIARLY KNOWN AS LAUNDRY BLEACH)	SPINACH
SOLANINE (A POISON)	POTATOES
HYDROGEN CYANIDE (LETHAL AGENT USED IN A GAS CHAMBER)	LIMA BEANS, APRICOT PITS
ARSENIC (A POISON)	SEAFOOD
MYRISTICIN (A STRONG, HALLUCINOGENIC DRUG)	NUTMEG
ACETONE (A PAINT REMOVER)	COFFEE

12, 33, 47, 56, 58, 66

Before you decide to never again eat french fried potatoes or drink a cup of coffee, rest assured. The amounts of toxins naturally present in most foods will not harm us. The human body has built-in defenses capable of handling small amounts of such harmful chemicals.[12]

There are no poisonous chemicals, (just poisonous amounts)!

Any substance, natural or man-made, could probably be toxic if consumed in large amounts, even pure water. The key is "amount." Phosphorus is a known poison, but it is also one of the most used elements in body processes.[21] Vitamin A is essential to our well-being, but too much of this necessary nutrient can cause severe health problems.[75] Even arsenic is needed in some life chemistry.[21]

We have discussed the important roles additives play in keeping our food supply plentiful, fresh, and appealing. The use of some specific additives protects us from known deficiency diseases and perhaps other serious problems as well, such as stomach cancer.[82] But there are approximately 3000 chemicals used in food processing.[16] What about the majority of these strange-sounding chemicals--are they safe?

Many critics of food additives tend to forget that all foods are composed of chemicals. Indeed, everything made by living cells is chemical. To give you an idea just how many chemicals are found in many of our most common foods and what their names look like, try the following exercises. If you have correct answers, reading the letters down will name the primary area of concern in this section of *Eat, Drink, and Be Healthy*!

50 lbs
50 lbs

Exercises

All Foods Are Chemical

MATCH BY PLACING THE LETTER OF THE CORRECT NUMBER OF CHEMICALS BEFORE EACH OF THE FOLLOWING FOODS:[26,47,58]

_____1. Coffee	F. 150
_____2. Orange Oil	S. 350
_____3. Potato	E. 140
_____4. Milk	A. 42

MATCH BY PLACING THE LETTER OF THE CORRECT FOOD BEFORE EACH OF THE CHEMICAL DESCRIPTIONS: [4, 8, 25, 82] (These are just partial listings of the chemicals present in the foods.)

_____1. Water, triglycerides of stearic, palmitic, oleic and linoleic acids; myosin and actin; glycogen, collagen, lecithin, cholesterol, dipotassium phosphate, myoglobin and urea.	T. Scrambled Eggs
	N. Onions
	E. Beefsteak
_____2. Starches, sugars, cellulose, pectin, malic acid, citric acid, succinic acid, anisyl propionate, amyl acetate, ascorbic acid, vitamin A, riboflavin, thiamine, and phosphates.	G. Cooking Fats and Shortenings
	A. Melon
_____3. Ovalbumin, conalbumin, ovomucoid, mucin, globulins, amino acids, lipovitellin, livetin, cholesterol, lecithin, lipids (fats), fatty acids, butyric acid, acetic acid, sodium chloride, lutein, zeaxanthine, vitamin A, and phosphates.	I. Coffee
_____4. Caffeine, essential oils, methanol, acetaldehyde, methyl formate, ethanol, dimethyl sulfide, propionaldehyde, acetone, methyl acetate, furan, diacetyl, butanol, methylfuran, isoprene, and methylbutanol.	
_____5. Propionaldehyde, methyl alcohol, propyl mercaptan, hydrogen sulfide acetaldehyde, sulfur dioxide, dipropyl disulfide, and propyl alcohol.	
_____6. Triglyceride esters of palmitic, oleic, linoleic and stearic acids.	

Additives – Just How Much Is Used?

Chemicals are added to food in such small amounts that they cannot be measured in pounds or even grams. For this reason the abbreviations ppm, ppb, and ppt are used when discussing the amount of additives in food. PPM stands for parts per million, PPB for parts per billion, and PPT for parts per trillion. These small amounts are extremely hard to imagine. It is just because they are so small that many people feel it is not necessary to become worried over the presence of additives in their food.

ppm
ppb
ppt

For example, BHA and BHT are preservatives commonly used in baked goods, cereals, and other foods containing fats and oils. In the average American diet, both of these antioxidants are consumed in amounts slightly less than 4 ppm--four parts per million.[18] This proportion may be easier to understand if you just consider:

- 4 PPM EQUALS ONE-EIGHTH OF ONE OUNCE FOR EACH TON OF FOOD!
- A LARGE NEEDLE IN A 1-TON HAYSTACK COULD BE 4 PPM BY WEIGHT!
- 4 PPM IN ALL THE FOOD A PERSON MIGHT EAT IN A NORMAL LIFETIME WOULD EQUAL ABOUT 4 MOUTHFULS!
- 1 PPB IS THE EQUIVALENT OF ONE INCH IN 16,000 MILES OR ONE MINUTE IN 20,000 YEARS.
- 1 PPT? IF YOU FILLED AN OLYMPIC-SIZED SWIMMING POOL WITH ICED TEA AND DROPPED ONE GRAIN OF SUGAR INTO THE POOL -- AND STIRRED THE MIXTURE THOROUGHLY -- YOU MIGHT HAVE ONE PART PER TRILLION![12,18]

In the space below, try writing one part per million, one part per billion, and one part per trillion as fractions.

A Closer Look at Food Additives

The Federal Food, Drug, and Cosmetic Act was passed in 1938. This law permitted the FDA to ban an additive only after it had proved the substance was actually harmful.[32] The law did not require any proof that the substance was safe before being introduced into the food supply.[18] The number of chemicals being used as food additives increased dramatically after the passage of that law. Some were so acutely toxic that it was not difficult for the FDA to prove in court that they were harmful.[18] The big problem, however, was the many substances which had not been sufficiently tested to show they were safe. Tests of long-used additives were uncovering one new hazard after another. Suspicions grew about the many additives still untested.[32]

In 1950, in response to a growing concern about the safety of food additives, a House committee headed by Rep. James Delaney (D.-N.Y.) opened extensive hearings to investigate the use of chemicals in foods. This resulted in the passage of the Pesticide Chemicals Act in 1954, the Food Additives Amendment in 1958, and the Color Additive Amendments in 1960. In all of these laws, the intention of Congress was not to ban the use of food chemicals, but to insure their safety when properly used.[18]

The Food Additives Amendment prohibited the use of new food additives until industry could prove by scientific research that the additives were safe under the conditions of their intended use.[56] The FDA would then issue regulations governing the use of the additives. The law covered both intentional and incidental additives.

The Delaney Clause is a part of the 1958 Amendments. The Delaney Clause required that no food additive be approved if it was found to cause cancer in humans or animals.[10] This clause is binding on food manufacturers and government agencies alike, regardless of the amount of the additive planned to be consumed over the lifetime of either humans or animals.[18] No additive, then, could be approved for any purpose or in any amount if it was found to cause cancer. The passage of this restriction was an expression by Congress that no degree of risk to cancer was acceptable. Since then, the Delaney Clause has become very controversial.

The Delaney Clause

NO ADDITIVE SHALL BE DEEMED TO BE SAFE IF IT IS FOUND TO INDUCE CANCER WHEN INGESTED BY MAN OR ANIMALS, OR IF IT IS FOUND, AFTER TESTS WHICH ARE APPROPRIATE FOR THE EVALUATION OF THE SAFETY OF FOOD ADDITIVES, TO INDUCE CANCER IN MAN OR ANIMAL . . . .[24]

In 1969, the widely used artificial sweetener, cyclamate, was found to cause cancer in test animals. It was eliminated from foods and beverages.[34] The color Red No. 2 was banned in 1976,[20] although its safety had been questioned several years earlier.[19] Other colors banned include Carbon Black, Red No. 4, and Violet No. 1.[36, 51]

At present, much concern is centered on the safety of saccharin and sodium nitrates and nitrites. The Delaney Clause is the center of the controversy. In order to understand some of the issues involved, consider what has occurred to saccharin. In 1977, the FDA proposed to ban saccharin because of its cancer-causing characteristics. This set off a widespread public reaction. Consumers, especially diabetics and overweight individuals, felt their health might be impaired if diet sodas were banned. Others challenged the Government's authority to prohibit the use of a substance. They felt the public should have the freedom to use any substance it wants, so long as the label carried appropriate warnings. Scientists questioned the reliability of the evidence that saccharin causes cancer.[67]

Let's look at the order of events that led to this controversy:

1970: Testing of saccharin began in earnest after FDA banned cyclamate, because then saccharin was the only artificial sweetener on the market, and its use increased dramatically.
1971: A study showed saccharin caused bladder cancer in rats and raised doubts about its safety.
1972: The FDA put limits on the use of saccharin.
1973: Another study indicated that large amounts of saccharin in the diets of test rats could cause cancer. The FDA asked the National Academy of Sciences to review again the possible cancer-causing potential of saccharin.
1974: The scientists reported that the data did not establish conclusively that it was saccharin that caused the cancer or a contaminant found in saccharin. The Canadian government began tests, using pure saccharin without the contaminant.
1977: The results of the Canadian tests demonstrated beyond serious question that saccharin causes bladder tumors in test animals. FDA then announced an intention of banning saccharin, but public reaction from food manufacturers and consumers alike pressured Congress into passing a law postponing the ban for 18 months to provide time for additional study of the artificial sweetener's effect on health.
1978: The National Academy of Sciences reported that saccharin must be viewed as a potential cause of cancer in humans, not only because it is a weak cancer-causing agent itself, but also because it possibly promotes the cancer-causing activity of other substances.
29, 67, 71, 72
1980: ????

The Delaney Clause states that no additive found to cause cancer can be used, but many consumers, scientists, and representatives of the food industry feel the clause is too rigid. No consideration is given to the value of the benefits of an additive as opposed to its risks. Others, though, are pushing to strengthen the law. Here are both sides:

DELANEY CLAUSE

CON	Since the passage of the Delaney Clause our ability to detect chemical residues in animals has become as much as one million times more sensitive. Therefore, we can detect traces of harmful chemicals in foods already proven safe by human experience, and the Delaney Clause is no longer valid.[49]
PRO	*The Delaney Clause has been invoked only a few times in twenty years. It is not used irrationally to remove all kinds of foods from the market. The banned additive must be proven to cause cancer.*[49]
CON	People have been using saccharin for almost eighty (80) years with no medical evidence that it causes bladder cancer in humans. Why ban it?[29]
PRO	*Studies have shown that saccharin causes bladder cancer in test animals. Canada banned saccharin in 1977. Why should Americans take the risk?*[67]
CON	Population studies of diabetics using large amounts of saccharin do not show an increase in the rate of bladder cancer.[29,73]
PRO	*The risk is much smaller than can be detected using population studies. The normal risk of developing bladder cancer is 1.50 percent--that is, 150 cases for every 10,000 people. Drinking one can of diet soda a day over a lifetime would increase the risk to 1.54 percent.*[29]
CON	Feeding extremely large doses of any chemical to animals is bound to cause problems. The dosages were equivalent to our drinking 800 twelve-ounce size diet sodas a day over a lifetime![29]
PRO	*Large doses of most chemicals do cause problems, but very rarely cancer. Thousands of chemicals have been tested in huge amounts in animals. Too much may kill the animals, but only cancer-causing substances will give them cancer.*[3]
CON	There is no way to determine from checking animals exposed to high doses of a cancer-causing chemical precisely how many humans might get cancer from a lower dose.[67]
PRO	*There are reliable methods for estimating the maximum number of people who might be affected. Using these methods, FDA scientists calculate that even moderate use of saccharin, the amount present in one large diet soft drink, if ingested daily over a lifetime by every American might lead to 1200 additional cases of bladder cancer per year.*[67]
CON	Even if large doses of a chemical do cause cancer in animals, scientific evidence suggests that there would be a low level of the chemical which man could safely ingest with no difficulties. At the present, the FDA only permits for human use 1/100 of the amount that is linked with non-cancerous effects.[56]
PRO	*Reducing the amount of the dosage does not remove the risk of cancer; it just lessens it. When you're exposing around 200 million people to a chemical, even a very small risk results in a large number of cancer cases.*[49] *Tests have shown that all but one of the 30 or so chemicals known to cause cancer in people also cause cancer in animals.*[67]

Legislative Dilemma

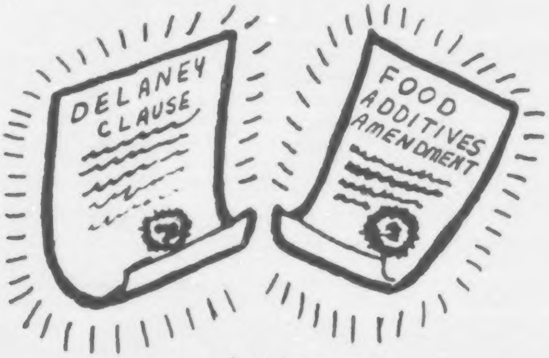
Assume that you serve in the Federal Congress. You are considering the DELANEY CLAUSE in the Food and Drug Laws of this nation. You have read the PROSs and the CONs about this clause.

What would you DO??????????

Why would you do THAT? (Give your reasons.)

How would you go about getting others to agree with you and vote your way in Congress? (Give your arguments and means of persuasion.)

Your class might stage a mock Congressional debate on the Delaney Clause today.



Generally Recognized As Safe ~~Suspect~~

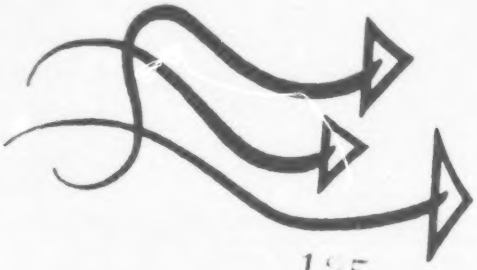
Another controversial provision of the 1958 Food Additives Amendment was that it did not require safety testing and premarketing clearance for all additives. Approximately 700 substances, which qualified scientists generally recognized as safe under the conditions of their intended use, were excluded from the scientific testing required for new additives.[66]

Although they are added to food, GRAS substances are not legally regarded as food additives because of their "excluded" status. Food manufacturers can use them freely. Included on the GRAS list are substances with a long, unmarred history of use in food. GRAS substances include vinegar, salt, pepper, baking powder, mustard, sugar, ascorbic acid, caffeine, monosodium glutamate, vitamins, minerals, and so on.

When cyclamates, one of the GRAS substances, were banned in 1969, the President directed the FDA to review the safety of all materials being added to food, particularly those substances generally recognized as safe.[66]

The first step in the GRAS review was to collect all available data over the past 50 years on each of the substances. This resulted in about 150,000 studies--16,000 of them for vitamin A alone. All that material was then summarized for each substance. It was supplemented by animal test data where available. A committee of the Federation of American Societies of Experimental Biology is reviewing all the data. Reports of its findings go to the FDA.[56,76]

In its reports issued so far, the committee has found most GRAS substances present no hazard to health from current uses or as they might be used in the future. They have, though, expressed various reservations or concerns on about six percent of the substances reported on as of February 1, 1978.[39] Here are some of the more commonly used GRAS substances about which the committee has raised questions or made comments:



CAFFEINE: SOME MEMBERS CONSIDERED IT A POTENTIAL HAZARD FOR CHILDREN EXPOSED TO DAILY DOSES; POSSIBLE CAUSE OF BIRTH DEFECTS; RECOMMENDED LONG-TERM STUDY.

MONOSODIUM GLUTAMATE (MSG): NO EVIDENCE OF HAZARD TO ADULTS; POSSIBLE HAZARD TO INFANTS; FURTHER STUDY NEEDED. (MSG IS NO LONGER USED IN BABY FOOD.)

LICORICE: NO EVIDENCE OF HAZARD WITH NORMAL USE, ALTHOUGH OVERINDULGENCE CAN CAUSE TEMPORARY SYMPTOMS OF HIGH BLOOD PRESSURE.

SUGAR: NO EVIDENCE OF HARMFUL EFFECTS OTHER THAN TOOTH DECAY; SUGGESTED FURTHER STUDIES TO DETERMINE IF SIGNIFICANTLY INCREASED CONSUMPTION WOULD BE HAZARDOUS TO HEALTH.

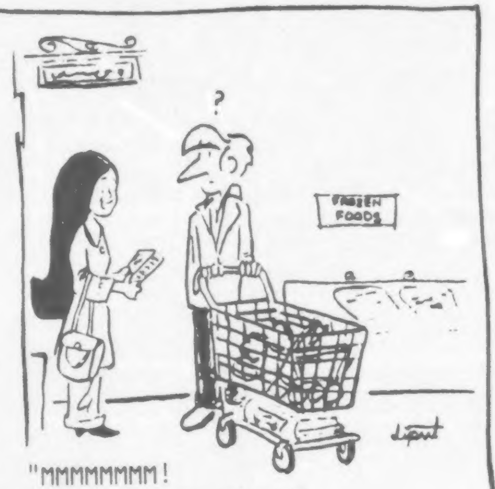
NUTMEG AND MACE: ALTHOUGH NO EVIDENCE OF HAZARD WAS FOUND, UNCERTAINTIES REQUIRE FURTHER STUDY OF THESE AND RELATED SUBSTANCES.

BHA AND BHT: NO EVIDENCE TO DEMONSTRATE BHA IS A HAZARD TO THE PUBLIC WHEN USED AT CURRENT LEVELS, BUT SUGGESTED FURTHER STUDY; MORE SERIOUS QUESTIONS ABOUT THE SAFETY OF BHT, AND IT REQUIRED FURTHER STUDY.[39]

After reviewing each substance, the FDA then determines its new classification:

1. AFFIRMED AS GENERALLY REGARDED AS SAFE AND LEFT ON GRAS LIST.
2. PLACED ON A NEW GRAS LIST, BUT WITH RESTRICTIONS.
3. CONVERTED TO A REGULATED FOOD ADDITIVE STATUS WITH STRICT CONTROLS OVER ITS USE.
4. JUDGED UNSAFE AND BANNED FROM USE IN FOOD.[56]

The FDA expects to have all the substances in the GRAS review at least tentatively reclassified by 1983.[39]



"MMMMMMMM!
THIS SOUNDS REALLY
GOOD . . . CONTAINS
NO KNOWN HARMFUL INGREDIENTS!"

With concern being expressed about substances that had been used for some twenty years (as cyclamates), or eighty years (as saccharin), or even for hundreds of years (as with MSG), it is no surprise that many people question the use of additives. As with all debates, though, there are two sides ... .

PRO

Food additives permit only eight percent of our population to feed the remaining 92 percent.[8] Additives preserve foods that otherwise would quickly spoil, and America is just too large a nation to depend completely on fresh foods.[6]

Additives make foods look and taste better, and they allow us to have out-of-season foods and convenience foods that might otherwise take hours to prepare. Food additives are used in such small amounts that we do not need to be concerned about their safety. Chemicals have been used in the kitchen for years. For example, salt is nothing more than SODIUM CHLORIDE.[6]

Any chemical used in food must first undergo strict testing. The FDA must be given information about the identity of the new chemical, how it's made, and how it can be measured in food. Evidence must also be shown that the additive is safe for its intended use and that the amount proposed is no higher than that reasonably necessary to accomplish the desired effect. Food additives have been more carefully studied than many of the natural toxins found in food.[8]

CON

One theory suggests that synthetic colors and flavors used in food may cause some children to be unusually active and interfere with their ability to learn.[57]

Several synthetic food colors have been banned, and the safety of others is in doubt. Norway has banned them all, and many experts in this country question using chemicals that do nothing but make a food look more attractive.[8]

Food additives that are individually safe may add up to a toxic burden in a person who consumes hundreds of different food additives daily--not to mention the chemicals taken in from medications and polluted air and water.[8,32] Although it has not happened yet, the possibility exists that two or more food components (natural or added) could interact synergistically to create greater hazard than either substance alone.[47]

Many additives once considered safe have proven to be potentially dangerous. Cyclamates and Red Dye No. 2 have already been banned for causing cancer in lab animals. There are very serious questions about the safety of other additives, including sodium nitrite, Red Dye No. 40, saccharin, BHT, and a drug called DES which used to be fed to beef cattle.[5,34,64,67,81]

Food additives are worldwide

Millions of people around the world would go hungry if food additives were not used. The United Nations recognizes that food additives are necessary, so it has issued a set of RECOMMENDATIONS about their use. They are:

1. A FOOD ADDITIVE SHOULD BE TECHNOLOGICALLY EFFECTIVE.
2. A FOOD ADDITIVE SHOULD BE SAFE IN USE.
3. A FOOD ADDITIVE SHOULD NOT BE USED IN ANY GREATER QUANTITY THAN IS NECESSARY TO ACHIEVE THE INTENDED EFFECT.
4. A FOOD ADDITIVE SHOULD NEVER BE USED WITH THE INTENTION OF MISLEADING THE CONSUMER AS TO THE NATURE AND QUALITY OF FOOD.
5. THE USE OF NON-NUTRIENT FOOD ADDITIVES SHOULD BE KEPT TO THE PRACTICABLE MINIMUM.[4]

The U.N. also recognizes that there are ways of using food additives that are NOT in the best interests of the consumer, so it has RECOMMENDED that food additives not be used...

1. TO DISGUISE THE RESULTS OF POOR PROCESSING AND HANDLING.
2. TO DECEIVE OR MISLEAD THE CONSUMER.
3. WHEN THE RESULT IS A REAL LOWERING OF THE NUTRITIONAL VALUE OF THE FOOD.
4. WHEN THE CHEMICAL EFFECT CAN BE OBTAINED BY FOOD MANUFACTURING PROCESSES WHICH ARE NOT OVERLY COSTLY.[4] (FOR EXAMPLE, WHEN A FOOD CAN BE PRESERVED BY PROPER COOKING AND STORAGE INSTEAD OF BY A CHEMICAL.)

Open and Closed Cases

You have read about FOOD ADDITIVES on the previous pages. You have noticed the PRO and the CON sides of the arguments surrounding food additives. Some people feel that we have enough evidence from researchers. They see a CLOSED CASE--they are willing to make a judgment. Others think that the case is OPEN--we don't have adequate evidence to make a judgment.

From the material in this PAL, do you think that the case about food additives is . . . . . .OPEN . . . . or CLOSED?

WHY?

SOME persons will disagree with you. How can they do that? Didn't you all read the SAME EVIDENCE in this PAL?

Is it reasonable that good, thinking persons--reading the same evidence--will disagree on the conclusions to be drawn from that evidence?

Review Time

Are food additives safe?

A. CIRCLE THE LETTER OF ALL THE CORRECT MULTIPLE CHOICE ANSWERS FOR EACH OF THESE INCOMPLETE SENTENCES. (There may be more than one correct answer per question.)

1. Cyclamate, Red Dye No. 2, and saccharin are additives which

   (a) are generally recognized as safe for human consumption.
   (b) are used to preserve food.
   (c) have been found to cause cancer in test animals.

2. In 1958, the Delaney Clause, part of an amendment to the 1938 Federal Food, Drug, and Cosmetic Act, was passed. Which of the statements below is true?

   (a) The Delaney Clause requires the FDA to thoroughly test every additive before placing it on the GRAS list.
   (b) The Delaney Clause requires that no food additive be approved if the additive is found to induce cancer in man or animals.
   (c) The Delaney Clause requires the FDA to ban the use of any additive found to cause cancer.

3. The GRAS list is a list of additives

   (a) which the FDA says are Generally Recognized As Suspect and may not be used for human consumption.
   (b) which are Generally Recognized As Safe and may be used in human foods.
   (c) which are presently undergoing an extensive review to establish their safety.

B. IF THE STATEMENT SUPPORTS THE USE OF FOOD ADDITIVES, WRITE "PRO" IN THE BLANK SPACE; IF AGAINST, WRITE "CON."

__________ 1. Additives preserve foods that otherwise would spoil.

__________ 2. In a very real sense, additives cannot be tested for absolute safety. They can only be tested for the presence of known hazards.

__________ 3. Additives allow us to have out-of-season and convenience foods.

__________ 4. Some additives which we consume every day have not, as yet, been proven safe for human consumption.

__________ 5. Additives are consumed in extremely small amounts.

__________ 6. No one knows the long-range effects of eating additives over the length of a lifetime.

__________ 7. Newly proposed additives must undergo testing by food companies.

__________ 8. Some additives once thought to be safe have been proven to cause cancer in test animals.

__________ 9. There are no harmless substances; there are only harmless ways of using substances.

__________ 10. Some additives which may be potentially dangerous to humans are still used in foods today.

FIND AN ARTICLE IN A MAGAZINE OR NEWSPAPER ABOUT THE SAFETY OF A PARTICULAR FOOD ADDITIVE OR FOOD ADDITIVES, IN GENERAL. READ THE ARTICLE CAREFULLY AND ANSWER THE FOLLOWING QUESTIONS:

A. What was the main idea of the article?

B. How did the author substantiate his main point? (Statistics, research results, facts, opinions, etc.)

C. Where did the author get his information? What do you know about the author? (Education, knowledge of subject, connection to consumer group or industry, other writings, etc.)

D. Do you feel information as presented in this article can be accepted as factual or should be regarded as an opinion?

E. Have your views toward that particular additive (or towards additives, in general) been changed after reading this article? If so, in what way?

Food ads & advertising...
What is the connection?

102 145

DICTIONARY

passwords . . .

Food ads & advertising...
What is the connection?

ADVERTISE	To arouse a desire to buy a product, usually by emphasizing desirable qualities
HEALTH FOODS	Foods which are claimed to have special virtues in preventing, treating, and curing disease or providing superior health; such claims are not permitted on food labels
NATURAL FOODS	Foods in the same form as when they were harvested--raw, uncooked; can also refer to products marketed without preservatives, emulsifiers, or artificial ingredients
ORGANIC FOODS	Foods grown without the use of chemical fertilizers or pesticides

Ready to Move On?

Do You Know the Passwords?

In 1906, a book called The Jungle, written by Upton Sinclair, was published. The book's descriptions of filthy meat packing plants disgusted and outraged many Americans. Their loud reactions became a powerful, moving force that helped persuade Congress to pass the Pure Food and Drugs Act of 1906, as well as the Meat Inspection Act of the same year.[18]

Public concerns are often reflected in advertisements. Ads have shown a concern over food purity down through the years. Many ads try to capture something called "the mood of the moment." For example, after The Jungle was published, food processors began explaining how pure and good their products were. They tried to separate themselves from the filthy conditions described in the book.[52]

Right now, we know little about the long-range effects of additives and the possible harm over a lifetime. Because recent scientific tests have indicated the danger of certain food chemicals, Americans are alarmed once again. Manufacturers have again picked up on the theme of food safety in their food advertisements. Many ads brag about a food's being "natural." At least one major food processor has placed ads in national magazines which defend the use of additives. Baby food companies declare their foods to be free of salt, sugar, added preservatives, artificial flavors, or colors. A major hamburger chain advertises one of its sandwiches as being made with 100 percent pure, domestic beef--no fillers, no additives. Health food stores are promoting additive-free and organically grown foods.

Some companies have found a good thing in the "additive scare." The "natural," "organic," and "health food" businesses are growing at a tremendous rate. In 1972, sales in health food stores and other retail outlets for natural foods reached about $550 million. This was up from $400 million just one year previously.[14]

Organic foods are likely to cost the consumer considerably more than the same items produced and marketed by regular commercial methods. A study which compared the prices of 55 common food items at a chain supermarket and at a "natural" food store on the same day found quite different prices. Processed foods in the "natural" food store were, on the average, almost twice as much as in the supermarket. Unprocessed, or natural, foods averaged almost two-thirds more.[74]

The term HEALTH FOODS is particularly confusing because every food that offers the body something it needs contributes to health. Usually, health food refers to a food claimed to have special virtues in preventing, treating, and curing disease or providing superior health. FDA regulations do not permit such claims to be stated on food labels. However, claims can be made in special articles or pamphlets used to advertise "health foods."[74]

Additives and Advertising!

Let's consider some items which proudly advertise that additives are included in them and products that proudly advertise that they are "additive-free." Select one such food item for each category from the variety of processed food and drink which you consume. Answer the following questions, and, if possible, bring the advertisements and food products (at least, the labels) into class.

PROUD OF ADDITIVES PROUD OF BEING ADDITIVE-FREE

NAME THE PRODUCT:

______________________ ______________________

ACCORDING TO THE ADVERTISEMENTS FOR THE PRODUCTS:

1. WHAT SHOULD WE WANT THE PRODUCT TO DO FOR US?

______________________ ______________________
______________________ ______________________
______________________ ______________________
______________________ ______________________

2. WHY SHOULD WE CHOOSE YOUR PRODUCT OVER ITS COMPETITORS?

______________________ ______________________
______________________ ______________________
______________________ ______________________
______________________ ______________________

WHAT ARE THAT PRODUCT'S COMPETITORS?

______________________ ______________________
______________________ ______________________
______________________ ______________________
______________________ ______________________

Given the list of ingredients in YOUR PRODUCTS, what do you know about them? What do they do? (What purpose do they serve?)

What's In a Name?

QUESTION "Y" WORDS !

buttery-tasting

Any dictionary can tell you that the suffix "-y" means "somewhat like, or suggesting." So, if a pancake syrup is supposed to have a buttery flavor, it might be due to some substance more common to a high school chemistry class than your kitchen refrigerator. The same goes for things that taste lemony, peachy, or chocolatey. Pure cocoa tastes chocolatey, but so does chocolate mixed with gums, emulsifiers, or wax![6]

taste of whole wheat

WATCH THE SPELLING !

Smart shoppers know how to spell! If an advertiser says a certain brand of cupcakes are "creme-filled," you can be sure that there isn't any c-r-e-a-m in them! Likewise, a Frute Bar probably never saw an apple, a peach, or a grape![6]

ROAST
BEEFIER
HASH

LOOK FOR FLAVORS !

If there is any implication on the label (including pictures) or in advertising that the food has a characterizing flavor, then the flavoring ingredients must be listed on the label. But you can also look carefully at the food product description. If it says "lemon pudding," then the flavor must come entirely from lemons.[65] Likewise, "vanilla ice cream" must be flavored with 100 percent real vanilla flavoring from pure extracts or beans. However, if the label reads "vanilla-flavored ice cream," then the flavoring may consist of up to 49 percent artificial vanillin. If it reads "artificially flavored vanilla ice cream," then the ice cream can contain anywhere from 50 to 100 percent artificial vanillin.[44]

new Cream of Onion
Soup. Made rich and
creamy and flavored with

LISTEN AND READ CAREFULLY !

When some TV baking wizard says that new Fake Cake tastes more like real chocolate than Brand X, he didn't say it had more chocolate in it, only that it tasted like it did. There's a big difference.[6]

hardwood smoked
flavor

TAKE NOTHING FOR GRANTED !

Your mind will believe what your stomach wants it to! Think twice about commonly used advertising words like "golden" (which makes you think of eggs), "rich" (which makes you think of butter), or "whipped" (which makes you think of cream). If a product really had all those good good things in it, it would be so uncommon that the advertisers would surely tell you loudly and clearly![6]

cheddar flavor

ADVERTISING AND LABELS ARE DIFFERENT !

Let's be fair. How else can a food manufacturer describe something with fake chocolate except to say that it tastes "chocolatey?" That's what ads are for anyway, to describe how the thing tastes. But don't expect ads to do the job of food labels and tell you exactly what is in the product. If that's what you want to know, READ THE LABEL AND IGNORE THE ADVERTISEMENT![6]

a smoother, richer flavor

IMAGINE ....

Imagine that you are going into business to introduce the following new and exciting products on the market. What--to influence potential buyers--would you call them?

* * * * * A new brand of ice cream

* * * * * A new type of cupcake

* * * * * A new high-fiber cereal

* * * * * A new brand of fish cake

* * * * * A new chocolate milk drink

* * * * * A new powdered orange drink

* * * * * A totally new food product

Justify your names for the new products. Why did you select them? What was most important in the selection? What impact does each name have on potential buyers?

Review Time

Food ads & advertising... What is the connection?

WRITE T BEFORE EACH STATEMENT THAT IS TRUE AND F BEFORE EACH STATEMENT THAT IS FALSE. CHANGE EACH FALSE STATEMENT TO MAKE IT TRUE.

_____ 1. The book, The Jungle, described filthy conditions in meat packing plants in the early 1900's.

_____ 2. Because of the book, The Jungle, food additives were not allowed in food until 1976.

_____ 3. Advertisements seldom appeal to the public's current concerns.

_____ 4. Some food ads today brag about how pure and natural the food is.

_____ 5. Advertisers sometimes use words like "rich" and "golden" to make you think of certain desirable ingredients.

_____ 6. An advertiser is not allowed to misspell words like FROOT (FRUIT) on the labels of food products.

_____ 7. Ingredients used in the processing are listed on the labels of most food products.

_____ 8. A box of dessert mix pictures a large strawberry on the cover. That indicates that fresh strawberries should be used in preparing the food.

_____ 9. It is illegal for a box of cereal to proudly proclaim, "Just eating one bowl of this super-fortified cereal everyday will build up your natural body defenses to resist any disease!"

_____10. Organic refers to foods grown in specially-treated water, not soil.

A. What do you think has been the most important reason for the rise in the number of "health food" stores across the nation? Is there such a store in your community? If there is, try to visit the store. Talk to the salesperson and ask if organic foods are "better for you" than foods grown by commercial methods and if so, then why. Report your findings to the class.

B. Compare foods sold in health food stores to similar foods sold in supermarkets. Compare price, quality, variety, etc.

C. Try to find at least three food or drink products that have misspelled words on their labels. What are the words? How do you feel about this? Should such misspellings be allowed?

D. Find at least 10 food or drink products with distinguishing flavors. List the flavor description on the label and the flavor ingredients shown in the ingredient listing for each product. How do they compare?

E. Choose a food or drink advertisement from a magazine or TV. Analyze the words used in the advertisement. What appeals do they make? Are they effective--do you want to try the product? Why?

F. Imagine that you have developed a "nutritious" cereal that resembles and tastes like a kind of fruit (strawberry, blueberry, apple, grape, banana, etc.). Give your product a name and write an advertisement, either for a magazine, radio, or TV to promote this product. Present your advertisement to the class for their reactions.

What is the government's role?

200
153

DICTIONARY

passwords ...

What is the government's role?

AMENDMENT	*A change in the law*
BOTULISM	*Acute food poisoning; can cause death*
CARCINOGEN	*A cancer-causing substance*
INTERSTATE	*Between two or more states*
RECALL	*A food manufacturer or processor "takes back" food that has already been distributed to food stores*

Ready to Move On ?

Do You Know the Passwords ?

> "ANYONE WHO SELLS BUTTER CONTAINING STONES OR OTHER THINGS (TO ADD TO THE WEIGHT) WILL BE PUT INTO OUR PILLORY, THEN SAID BUTTER WILL BE PLACED ON HIS HEAD UNTIL ENTIRELY MELTED BY THE SUN. DOGS MAY LICK HIM AND PEOPLE OFFEND HIM WITH WHATEVER DEFAMETORY EPITHETS THEY PLEASE WITHOUT OFFENSE TO GOD OR KING. IF THE SUN IS NOT WARM ENOUGH, THE ACCUSED WILL BE EXPOSED IN THE GREAT HALL OF THE GAOL IN FRONT OF A ROARING FIRE, WHERE EVERYONE WILL SEE HIM."
>
> Louis XI, King of France, A.D. 1481

Supposedly, we are more civilized today than people were 500 years ago. Today, in this country at least, the king's justice has been replaced with a system of laws to protect the food consumer. The idea of protecting buyers against unsafe food, however, is not a new idea, but hundreds of years old.

Even as long ago as 1202, King John of England passed the first food law, the Assize of Bread, forbidding the substitution of ground beans or peas for flour.[4] Since that first step, many more have been taken in the direction of consumer protection.

A number of food laws have been passed in this country. Let's take a look at them.

It's the LAW!

THE LIST BELOW IS A VERY BRIEF DESCRIPTION OF THE MAJOR FOOD LAWS THAT HAVE BEEN PASSED IN THIS COUNTRY OVER THE LAST 200 YEARS. SEVERAL OF THE LAWS DESCRIBED HERE HAVE HAD AMENDMENTS ADDED OVER THE YEARS TO STRENGTHEN THEM. ONE IMPORTANT AMENDMENT, THE DELANEY CLAUSE, HAS ALREADY BEEN DISCUSSED IN THIS PAL.

1784	MASSACHUSETTS ENACTED THE FIRST GENERAL FOOD LAW IN THE U.S.; "AN ACT AGAINST SELLING UNWHOLESOME PROVISIONS" DECLARED STIFF PENALTIES FOR KNOWINGLY SELLING "DISEASED, CORRUPTED, CONTAGIOUS OR UNWHOLESOME PROVISIONS" - BOTH FOOD AND DRINK.
1824	VIRGINIA PASSED A FLOUR INSPECTION ACT.
1850	CALIFORNIA PASSED A PURE FOOD AND DRINK LAW.
1891	ACT PASSED REQUIRING INSPECTION OF ANIMALS FOR DISEASE BEFORE SLAUGHTER.
1897	TEA IMPORTATION ACT REQUIRED INSPECTION OF ALL TEA ENTERING THE U.S.
1906	THE ORIGINAL FOOD AND DRUGS ACT PROHIBITED INTERSTATE COMMERCE IN MISBRANDED AND ADULTERATED FOODS, DRINKS, AND DRUGS; THE MEAT INSPECTION ACT REQUIRED INSPECTION OF ALL MEAT IN INTERSTATE TRADE.
1913	GOULD AMENDMENT REQUIRED DEFINITE INFORMATION ON FOOD PACKAGES.
1916	GRAIN STANDARDS ACT SET STANDARDS FOR GRAIN SHIPPED IN INTERSTATE COMMERCE.
1923	FILLED MILK ACT PROHIBITED INTERSTATE TRAFFIC IN MILK OR CREAM CONTAINING ANY FAT OTHER THAN MILK FAT.
1927	IMPORT MILK ACT SAID THAT IMPORTED MILK MUST MEET DOMESTIC STANDARDS.
1930	MCNARY-MAPES AMENDMENT AUTHORIZED STANDARDS OF QUALITY AND FILL FOR CANNED FOOD.
1938	THE FEDERAL FOOD, DRUG, AND COSMETIC ACT WAS ENACTED. IN REGARD TO FOOD, THIS LAW PROVIDED FOR TOLERANCES FOR UNAVOIDABLE POISONOUS SUBSTANCES; AUTHORIZED STANDARDS OF IDENTITY, QUALITY, AND FILL OF CONTAINER; AUTHORIZED FACTORY INSPECTIONS; AND PERMITTED COURT INJUNCTIONS.
1939	FIRST FEDERAL FOOD STANDARDS ISSUED FOR CANNED WHOLE TOMATOES, TOMATO PUREE, AND TOMATO PASTE.
1946	AGRICULTURAL MARKETING ACT SET STANDARDS FOR A NUMBER OF FOODS NOT COVERED BY OTHER LAWS.
1956	FISH AND WILDLIFE ACT WAS PASSED TO SET STANDARDS FOR FISH AND SHELLFISH.
1957	POULTRY PRODUCTS INSPECTION ACT WAS PASSED REQUIRING THE BEFORE AND AFTER DEATH INSPECTION OF THE ANIMALS, INSPECTION OF THE SANITARY STANDARDS OF THE PROCESSING PERSONNEL, AND PLANT MAINTENANCE.
1958	FOOD ADDITIVES AMENDMENT PROHIBITED THE USE OF NEW FOOD ADDITIVES UNTIL THE MANUFACTURER COULD ESTABLISH THEIR SAFETY AND FDA ISSUED REGULATIONS SPECIFYING CONDITIONS OF USE; CONTAINED THE DELANEY CLAUSE.
1960	COLOR ADDITIVE AMENDMENT GAVE FDA AUTHORITY TO CONTROL THE CONDITIONS FOR SAFE USE OF A COLOR ADDITIVE.
1966	FAIR PACKAGING AND LABELING ACT REQUIRED TRUTHFUL AND ACCURATE PACKAGING AND LABELING.
1967	WHOLESOME MEAT ACT AUTHORIZED THE SECRETARY OF AGRICULTURE TO AID THE STATES IN IMPLEMENTING INSPECTION PROGRAMS.

4,63

Reflecting on Government

Sure, we have a lot of food laws. But SHOULD we? Why does the government get involved in food matters? Are these the responsibility of government?

Read the following quotation from Abraham Lincoln, the 16th President of the United States:

> "THE LEGITIMATE OBJECT OF GOVERNMENT IS TO DO FOR THE PEOPLE WHAT NEEDS TO BE DONE, BUT WHICH THEY CANNOT BY INDIVIDUAL EFFORT DO AT ALL, OR DO SO WELL, FOR THEMSELVES."

Would Lincoln have supported laws regarding food additives in America? Why? Why not?

* * *

Consider the following situations (many unreal!) and make a judgment as to whether government (local, state, or Federal) should be involved:

☐ ☐ ☐ Mel owns a fast food shop on Route #99. He does a lot of business and never seems to have time to clean the place thoroughly. A few customers have complained about the floor, an occasional dirty dish, and the smudged counter tops.

☐ ☐ ☐ Carlos has a dairy farm. Some folks like unpasteurized milk--straight from the cows. Carlos aims to please. He sells milk to those who drive up and ask to buy it.

☐ ☐ ☐ Carol owns a dairy farm. She knows that Carlos--next farm over--is making money selling unpastuerized milk. People want it. So she began to make home deliveries of unpastuerized milk. Recently, she started selling it to supermarkets.

☐ ☐ ☐ George Amurizio works as a chemist. Recently, he developed a really neat red dye. It makes lipstick really red, cocktail cherries brilliant, etc. He was going to market it to food processors, but the government stopped him until he did tests. George is really angry: "Isn't this a free country?"

Been Ripped Off Lately?

does anybody really care?

Recalls

● MEAT—Grand Union Co. is recalling 1,300 3-lb. (1.359 kilograms) canned hams packaged by Colonial Provision Co. of Boston because about 425 cans may have been underprocessed. Hams carry code BD-5D est. 432 & were distributed in Massachusetts, New Hampshire, Vermont, Connecticut, New York, Pennsylvania, New Jersey, Maryland, Northern Virginia, Washington, DC & Puerto Rico. Undercooked hams could develop botulism bacteria.

WHAT TO DO: Return hams to stores immediately. Do not eat.

● INSTANT OATMEAL—Food & Drug Administration (FDA) announces recall of Kroger Instant Oatmeal, artificial maple & brown sugar flavor, 1-5/8 oz. (46 grams) packets (8 packets/carton). Code on carton & case: 1/3/76. Mfd. by Ralston Purina Co. Davenport, IA. Recalled by Ralston Purina Co., St. Louis, MO. Distribution to eastern U.S.; firm estimates that about 612 cases remain on market. Reason: product contains metal fragments.

● FRENCH DRESSING & BARBECUE SAUCE—Food & Drug Administration (FDA) announces recall of all Stewart Formula french dressing & all barbecue sauces produced between Sept. 24, 1974 & March 13, 1975. French dressing (gallon size [3.8 liters]) packed under "Stewart," "Salad Queen," "Divencenti," "Ellis & Sone" & "Butter Cup" labels. Barbecue sauces come in gallon, quart (1 liter) & 19 oz (560 milliliters) sizes & carry "Piknik" label & possibly 19 other private labels. Lot numbers: 09244 through 03135. Manufactured & recalled by Piknik Products Co. of Montgomery, AL. Distribution was to southeastern U.S. Reason: spice ingredients of both products were contaminated with insects. 69

Several times in this PAL, the Food and Drug Administration has been mentioned. This agency of the federal government has the primary responsibility for watching over our food supply and for seeing that food laws are enforced. The FDA acts for the public interest to ensure that consumers get safe, sanitary, and properly labeled products.[15]

However, the FDA can act only against products sold in interstate commerce. Products made and sold entirely within a state usually must be regulated by that state. Also, certain foods--red meat and poultry--are the responsibility of the Department of Agriculture, not FDA.[59]

In 1971, the FDA established the Cooperative Quality Assurance Program. Manufacturers choose to join this program, which requires following detailed safety and quality specifications.[40] The program was designed to assure safe and wholesome products to the consumer.[28]

All companies, however, did not choose to participate in this program. The FDA simply lacked enough inspectors to check all the food, and, in 1973, began the Agency's State contract program. This enabled state agencies responsible for consumer protection to carry on important FDA responsibilities--such as inspecting food warehouses and processing plants and analyzing food.[35]

When contaminated foods are discovered, the FDA may request the manufacturer to RECALL the dangerous products.[30] (See the examples on the left.)

The FDA encourages consumers to report foods that are mislabeled, unsanitary, or otherwise harmful.[15,42]

Here's how they suggest doing it.

GOT A GRIPE ?

Report it !

HORRIBLE HAPP

1. Report your grievance promptly, giving your name, address, telephone number, and directions to your home or place of business.

2. State clearly what appears to be wrong.

3. Describe the label of the product and give any code marks that appear on the container. (In the case of a canned food, these are usually embossed into or stamped on the lid of the can.)

4. Give the name and address of the store where the item was purchased and the date of purchase.

5. Plastic wrap and refrigerate the remains of the suspect product or the empty container for your doctor's guidance or possible examination by state or federal inspectors.

6. Hold any unopened container of the product bought at the same time.

7. If any injury is involved, see a doctor at once.

8. Also report the suspect product to the manufacturer, packer, or distributor shown on the label of the product and to the store where you bought it.

COMPLAINT
LETTER

Report to:

YOUR COUNTY HEALTH DEPARTMENT

YOUR STATE AGENCY:

Bureau of Food Grades and Standards
Division of Inspection
Florida Department of Agriculture
and Consumer Services
Tallahassee
Florida 32301 (904) 488-3951

THE FDA:

U.S. Food and Drug Administration
5600 Fishers Lane
Rockville, Maryland 10852

(You may have district offices of these agencies in your community. Check your telephone directory under the name of your state and under U.S. Government.)

WHAT IS THE ANSWER?

Following up on consumer complaints, banning food additives discovered to be carcinogens, or prosecuting food processors who abuse the law do not completely protect us from unsafe food or additives. For additives, a more simple solution would be to make the FDA and industry obey the 1958 Food Additive Amendments which state that there must be sufficient proof of safety of chemical additives.

BUT IS THAT THE ANSWER? WHAT IS SUFFICIENT PROOF OF SAFETY? WHO--GOVERNMENT, INDUSTRY, OR CONSUMERS--WOULD DETERMINE IT? HOW SAFE IS SAFE? THESE ARE DIFFICULT QUESTIONS TO ANSWER.

Passing judgment on an additive is often not a matter of good versus bad, or safe versus unsafe, but of weighing risk against benefit.[48]

For instance, one of the latest controversies centers around the additives, sodium nitrates and sodium nitrites. These additives combat the growth of bacteria producing the most deadly natural poison known to man, botulinum toxin. These additives are useful in preventing botulism. However, there is evidence that they combine with other chemicals in the food to form a substance known to cause cancer in animals.[56] In addition, one study has shown that nitrite itself may cause cancer.[77]

When the Department of Agriculture, in October, 1975, proposed eliminating nitrates and reducing the level of nitrites in a number of meat products, they were attacked from both directions. Some consumer organizations insisted they had not gone far enough. Nitrites do cause cancer and should be banned entirely. Scientists cannot say with certainty that there is a safe level of exposure--no matter how small--to a cancer-causing substance. Any exposure to such a substance is presumed to involve some risk.[17]

Others pointed out that other preservatives might not prevent botulism if the meat products were not handled properly. The elimination of nitrites would most certainly raise the price.[56] Also, nitrates and nitrites are not man-made substances, but natural compounds that are found in vegetables, drinking water, and human saliva. Less than one-fifth of our total daily body exposure to nitrites comes from cured meat products.[31] Banning nitrites could eliminate many of our favorite foods. Other preservatives might not enable hot dogs, ham, bacon, and other cured meats to keep their present identifying characteristics.

The issue of the safety of nitrates and nitrites is still unresolved. The latest proposal is to continue the use of nitrites at reduced levels.[47]

AS YOU CAN READILY SEE, THERE ARE NO CLEAR CUT SOLUTIONS!!!!!

Hopefully, this PAL has made you give some thought to a subject that you may not have thought much about before.

Possibly you have some questions about additives that this PAL did not answer. Possibly you may wish to find out more about this subject.

In the end, becoming more informed about what goes into your food is your best assurance of eating safely.

As a food consumer, you have certain rights and responsibilities. If you are concerned about this topic, here's what you can do:

1. DISCUSS THE SUBJECT OF ADDITIVES AND FOOD SAFETY WITH YOUR FRIENDS, PARENTS, AND RELATIVES.
2. WRITE MEMBERS OF CONGRESS, SENATORS, THE FDA, AND EVEN THE PRESIDENT. HEARING FROM YOU REALLY DOES MATTER TO THEM.
3. WRITE FOOD MANUFACTURERS AND TELL THEM YOUR CONCERNS. REQUEST MORE INFORMATION FROM THEM.
4. LISTEN FOR, AND READ NEWS ITEMS ABOUT FOOD ADDITIVES. GET FURTHER INFORMATION FROM LOCAL LIBRARIES.
5. MAKE LABEL READING A ROUTINE PART OF YOUR FAMILY'S SHOPPING TRIPS.
6. VOICE YOUR PROTEST OF A PRODUCT BY REFUSING TO BUY IT! THIS MAY HAVE MORE EFFECT THAN ANYTHING ELSE SINCE THE MANUFACTURERS RESPOND MORE QUICKLY TO LOST PROFITS THAN ANY OTHER MEASURE. IF YOU ARE TRULY CONCERNED ABOUT THE USE OF ADDITIVES IN YOUR FOOD, THEN LOOK FOR MORE NATURALLY PREPARED FOODS WITH FEWER ADDITIVES. MANY MORE FOOD PRODUCTS MADE THIS WAY ARE APPEARING DAILY.

REMEMBER, YOU ARE WHAT YOU EAT!

IT'S UP TO YOU!

"EAT, DRINK, & BE HEALTHY"!

Review Time

What is the government's role?

FILL IN THE BLANKS WITH A WORD OR WORDS WHICH WILL CORRECTLY COMPLETE EACH STATEMENT:

1. Consumer laws in this country are about __________ years old.
2. The ____, FDA for short, is the agency responsible for watching our food supply.
3. The FDA is responsible only for products sold in ______________ commerce.
4. When some food items on supermarket shelves contain higher than allowed levels of insect fragments, the FDA may order a _________ of the product.
5. When writing the FDA about a problem with a food product, the consumer should also tell the manufacturer or packer and the ____________ where the item was purchased.
6. When describing a problem food product in a letter to the FDA, a consumer should describe the label and any __________________ that appear on the container.
7. The FDA contracts with __________ agencies to help watch over our food.
8. The controversy over nitrites is a good example of weighing ___________ against ____________ in determining the safety of an additive.
9. An effective way of voicing protest of a product is by _______________ _______________________________________.
10. _____________________________ should be an important part of food shopping trips.

A. Did you, or anyone in your family, ever buy food that turned out to be contaminated (a can of tuna that was noticeably spoiled when opened, a jar of peanut butter with visible insect fragments in it, a candy bar with a worm in it, etc.)? If so, what did you do? If such a food problem ever occurs again, what will you do about it?

B. Assume you found a problem with some food--such as described above. Write a sample letter to the FDA describing the problem.

C. Look in your telephone directory for local offices of the FDA and state agencies that help protect consumers.

PERSONAL COMMITMENT

I, ______________________________, am concerned about food additive issues and problems discussed in this PAL. I have participated in the group's discussions of the problems and the goals which we feel should be pursued in order to ensure safe food consumption by all consumers in America.

My basic concern with food additives for the future is:

____

____

____

____

The goals which I believe are important are: __________

____

____

____

____

At this time, I believe I can help achieve these goals by taking the following actions:

1. ____
2. ____
3. ____

Dated ____________________ Signed ____________________

PERSONAL
COMMITMENT

210

SELF - EVALUATION

1. As you reflect back on your studies in this PAL, what were the most important things which you learned about FOOD ADDITIVES?

2. At this point, what do you think the RESPONSIBILITIES of each of the following are when it comes to safe and proper use of food additives:

   a) YOU -- the consumer:

   b) Food processors and manufacturers:

   c) Food sellers:

   d) The government (local, state, and/or Federal):

3. Of course, YOU are a consumer!!! What other CONSUMER TOPICS do YOU want to learn about?

Thanks for
being honest!

RESOURCES

1. Alfin-Slater, Roslyn, and Aftergood, Lilla. Nutrition for Today. Dubuque, Iowa: Wm. C. Brown Company, 1973.

2. Allentuck, Andrew J., and Bivens, Gordon E. Consumer Choice. New York: Harcourt Brace Jovanovich, Inc., 1977.

3. "Animal Tests and Human Health." FDA Consumer (September 1977), HEW Publication No. (FDA) 78-1036.

4. Benarde, Melvin A. The Chemicals We Eat. New York: McGraw-Hill Book Company, 1971.

5. "BHT and BHA as Food Additives." FDA Consumer MEMO, HEW Publication No. (FDA) 78-2037, 1978.

6. Blau, Melinda E. "To Buy or Not to Buy." Consumer Education Kit. New York: Random House, 1975.

7. Brewster, Letitia, and Jacobson, Michael F. The Changing American Diet. Washington, D.C.: Center for Science in the Public Interest, 1978.

8. Brody, Jane E. "Additives--Purely Natural or Simply Window Dressing?" Orlando (Florida) Sentinel Star, 27 July 1978, sec. E, p. 14.

9. ________. "Food Additives: the Benefits vs. the Risks." St. Petersburg (Florida) Times, 27 July 1978, sec. D, p. 26.

10. "Cancer Prevention and the Delaney Clause." Health Research Group, 2000 P Street NW., Washington, D.C., not dated.

11. "Chemical Cookery." Center for Science in the Public Interest, 1755 S Street NW., Washington, D.C. 20009, 1978.

12. Chou, Marylin. "Food Additives: Are They Really Bad for You?" Family Circle, 10 July 1978, pp. 122-129.

13. "A Close Look at Food Additives." Life and Health, February 1975, pp. 18-21.

14. Clydesdale, Fergus M., and Francis, Frederick J. Food, Nutrition, and You. Englewood Cliffs: Prentice-Hall, Inc., 1977.

15. "A Consumer Guide to FDA." FDA Consumer (October 1974), HEW Publication No. (FDA) 76-1013.

16. "Consumer's Guide to Food Additives." Department of Consumer Affairs, City of New York, 80 Lafayette Street, New York, New York 10013, not dated.

17. Corwin, Emil. "Why FDA Bans Harmful Substances." FDA Consumer (December 1978/January 1979), pp. 7-9.

18. Damon, G. Edward. "A Primer on Food Additives." FDA Consumer (May 1973), HEW Publication No. (FDA) 74-2002.

19. Damon, G. Edward, and Janssen, Wallace F. "Additives for Eye Appeal." FDA Consumer (July/August 1973), HEW Publication No. (FDA) 74-2008.

20. "Death of a Dye." Time, 2 February 1976, p. 53.

21. Deutsch, Ronald M. "Where You Should Be Shopping for Your Family." Nutrition Reviews, Supplement, July 1974, pp. 48-49.

22. "The FDA." Consumer Reports, March 1973, pp. 152-156.

23. "Federal Food, Drug, and Cosmetic Act, As Amended." U.S. Government Printing Office, October 1976.

24. "Food Additives Amendment of 1958, Section 409 (C) (3) (A), 21 U.S.C. Section 348 (C) (3) (A) (1964)." Quoted in Elizabeth M. Whelan and Fredrick J. Stare, Panic in the Pantry, New York: Atheneum, 1975.

25. "Food Additives: What They Are/How They Are Used." Manufacturing Chemists Association, 1825 Connecticut Avenue NW., Washington, D.C. 20009, not dated.

26 "Food Additives: Who Needs Them?" Manfacturing Chemists Association, 1825 Connecticut Avenue NW., Washington, D.C. 20009, not dated.

27. "Food Colors (Color Additives)." FDA Consumer MEMO, HEW Publication No. (FDA) 74-2054, 1974.

28. "Food Safety: A New Look at Corporate Responsibility." FDA Consumer (February 1974), HEW Publication No. (FDA) 74-2051.

29. "The Great Saccharin Snafu." Consumer Reports, July 1977, pp. 410-414.

30. Greene, James. "Clarifying Recall Policies." FDA Consumer (November 1976), HEW Publication No. (FDA) 77-1025.

31. Greve, Frank. "The Nitrite Scare: Never Mind." Orlando (Florida) Sentinel Star, 8 October 1978.

32. "The Growing Worry Over the Chemicals in our Food." Changing Times, June 1977, pp. 37-40.

33. Hall, Richard L. "Food Additives." Nutrition Today (July/August 1973), Reprint.

34. "Health, Food, and Nutrition." Consumers' Research, October 1978, pp. 177-184.

35. Hopkins, Harold. "Consumer Protection: The State Connection." FDA Consumer (October 1978) pp. 14-18.

36. ________. "Countdown on Color Additives." FDA Consumer (November 1976), HEW Publication No. (FDA) 77-2075.

37. ________. "Finding Out What ELSE You Eat." FDA Consumer (July/August 1975), HEW Publication No. (FDA) 76-2007.

38. ________. "Food Additives: Double Check on Safety." FDA Consumer (June 1977), HEW Publication No. (FDA) 77-2084.

39. ________. "The GRAS List Revisited." FDA Consumer (May 1978), HEW Publication No. (FDA) 78-2103.

40. ________. "A Greater Margin for Food Safety." FDA Consumer (September 1974), HEW Publication No. (FDA) 75-2014.

41. ________. "Nitrites: Focusing On Safety." FDA Consumer (February 1978), HEW Publication No. (FDA) 78-2095.

42. "How You Can Report to FDA." FDA Consumer MEMO, HEW Publication No. (FDA) 74-1001, 1974.

43. Hunter, Beatrice Trum. Food Additives and Federal Policy: The Mirage of Safety. New York: Charles Scribner's Sons, 1975.

44. ________. The Great Nutrition Robbery. New York: Charles Scribner's Sons, 1978.

45. Institute of Food Technologists' Expert Panel on Food Safety and Nutrition. "The Effects of Food Processing on Nutritional Values." Scientific Status Summary, Institute of Food Technologists, 221 North LaSalle Street, Chicago, Illinois 60601, 1974.

46. ________. "Mercury in Food." Scientific Status Summary, Institute of Food Technologists, 221 North LaSalle Street, Chicago, Illinois 60601, 1973.

47. ________. "Naturally Occurring Toxicants in Foods." Scientific Status Summary, Institute of Food Technologists, 221 North LaSalle Street, Chicago, Illinois 60601, 1975.

48. ________. "The Risk/Benefit Concept as Applied to Food." Scientific Status Summary, Institute of Food Technologists, 221 North LaSalle Street, Chicago, Illinois 60601, 1978.

49. "Is Law on Food Additives too Strict?" U.S. News and World Report, 30 May 1977, pp. 25-26.

50. Jacobson, Michael F. Eater's Digest. Garden City, New York: Doubleday and Company, Inc., 1972.

51. ________. Nutrition Scoreboard. New York: Avon Books, 1975.

52. Jones, Edgar R. Those Were the Good Old Days. New York: Simon and Schuster, Inc., 1959.

53. Katz, Deborah, and Goodwin, Mary T. Food: Where Nutrition Politics and Culture Meet. Washington, D.C.: Center for Science in the Public Interest, 1976.

54. "Keeping Foods Clean." FDA Consumer (May 1974), HEW Publication No. (FDA) 75-2002.

55. Kinder, Faye, and Green, Nancy R. Meal Management. New York: Macmillan Publishing Company, 1978.

56. Larkin, Timothy. "Exploring Food Additives." FDA Consumer (June 1976), HEW Publication No. (FDA) 76-2020.

57. ________. "Food Additives and Hyperactive Children." FDA Consumer (March 1977), HEW Publication No. (FDA) 77-2080.

58. ________. "Natural Poisons in Food." FDA Consumer (October 1975), HEW Publication No. (FDA) 76-2009.

59. ________. "Ten Fallacies About FDA." FDA Consumer (November 1975), HEW Publication No. (FDA) 76-1017.

60. "A Little Sweet Talk." Orlando (Florida) Sentinel Star, 18 July 1976, sec. F, pp. 1-2.

61. "Meat Tenderizers and Monosodium Glutamate (MSG)." FDA Consumer MEMO, HEW Publication No. (FDA) 74-2043, 1974.

62. Melnick, Daniel. A Teaching Manual on Food and Nutrition. Washington, D.C.: The Nutrition Foundation, Inc., 1975.

63. "Milestones in U.S. Food and Drug Law History." U.S. Department of Health, Education, and Welfare, HEW Publication No. (FDA) 73-1018, 1973.

64. "Nitrates and Nitrites." FDA Consumer MEMO, HEW Publication No. (FDA) 76-2067, 1975.

65. Nutrition Labeling: How It Can Work for You. Bethesda, Maryland: National Nutrition Consortium, Inc., 1975.

66. Packard, Vernal S. Processed Foods and the Consumer. Minneapolis: University of Minnesota Press, 1976.

67. Pines, Wayne L., and Glick, Nancy. "The Saccharin Ban." FDA Consumer (May 1977), HEW Publication No. (FDA) 77-2079.

68. "Quick Answers to Commonly Asked Questions About Food." Institute of Food Technologists, 221 North LaSalle Street, Chicago, Illinois 60601, not dated.

69. "Recalls." Consumer News, 15 June 1975, p. 2.

70. Rowse, Arthur E. Help: The Useful Almanac. Washington, D.C.: Consumer News, Inc., 1976.

71. "Saccharin Called Cancer Catalyst." Orlando (Florida) Sentinel Star, 5 November 1978, sec. A, p. 14.

72. "Saccharin Warning Notice Required in Stores." FDA Consumer (June 1978), p. 4.

73. "Second Opinions." Time, 7 August 1978, p. 68.

74. Shopper's Guide. Washington, D.C.: U.S. Department of Agriculture, 1974 Yearbook.

75. "Some Questions and Answers About Food Additives." FDA Consumer MEMO, HEW Publication No. (FDA) 78-2094, 1978.

76. Spiher, Alan T., Jr. "Food Ingredient Review: Where It Stands Now." FDA Consumer (June 1974), HEW Publication No. (FDA) 75-2004.

77. "Statement on Nitrites." HEW and USDA News Release, 11 August 1978.

78. "Too Much Sugar?" Consumer Reports, March 1978, pp. 136-142.

79. "We Still Don't Know Enough About Sugar Substitutes." Changing Times, July 1975, pp. 43-45.

80. "We Want You to Know About Use of Drugs in Animal Feed." Food and Drug Administration, HEW Publication No. (FDA) 78-6030, 1978.

81. "We Want You to Know What We Know About Drugs for Food-producing Animals." Food and Drug Administration, HEW Publication No. (FDA) 73-6009, 1973.

82. Whelan, Elizabeth M., and Stare, Fredrick J. Panic in the Pantry. New York: Atheneum, 1975.

83. Winter, Ruth. A Consumer's Dictionary of Food Additives. New York: Crown Publishers, Inc., 1972.

PROJECT $CAT

You have just completed studying one module of the SCAT curriculum. There may be other topics about which you wish to learn more. SCAT modules can help you acquire skills, concepts, and knowledge necessary to function as an informed and wise consumer in twelve areas.

HEALTH AND THE CONSUMER contains 6 units:

BALANCED DIET: Eater's Digest
FOOD ADDITIVES: Eat, Drink, and Be Healthy
FOOD SHOPPING: Food for Your Brood
MEDICAL CARE: Say Ahh!
PERSONAL GROOMING: Let's Face It!
PRODUCT SAFETY: An Ounce of Prevention

MONEY MANAGEMENT AND THE CONSUMER contains 6 units:

BASIC ECONOMIC SKILLS: Baffled, Bothered, Bewildered
BUDGETING: Easy Come, Easy Go!
BANKING: You Can Bank on It!
CREDIT: Ch..a..r..rge!!!
INSURANCE: It's Later Than You Think
TAXES: An Offer You Can't Avoid

"$KILLS FOR CONSUMERS APPLIED TODAY"

ACKNOWLEDGMENTS

This consumer education resource booklet was made possible by a grant for the development and dissemination of innovative instructional materials through ESEA Title IV-C, Research and Development, Department of Education, Tallahassee, Florida 32301.

The project staff would like to acknowledge the specific contributions of the many individuals with whom the staff consulted or worked in the planning and development of this project, but the list is simply too extensive to name each person. The project could not have been completed without the contributions of the many reviewers, teachers and students who field-tested the materials, consultants, and others who gave guidance and support to the project. However, a special thanks is in order to the members of a review panel who selflessly gave of their time and talents to extensively review the materials and then endorsed the resulting consumer education instructional units:

JANE ROBINSON, CHAIRPERSON
DIRECTOR OF CONSUMER SERVICES
FLORIDA DEPARTMENT OF AGRICULTURE

RODNEY F. ALLEN, PH.D.
DEPARTMENT OF EDUCATION
FLORIDA STATE UNIVERSITY

ERWIN BRYAN, JR.
PRESIDENT
CENTRAL PACKING COMPANY, INC.

R. F. MATTHEWS, PH.D.
DEPARTMENT OF FOOD SCIENCE
UNIVERSITY OF FLORIDA

DOROTHY M. SIDWELL
DEPARTMENT OF HOME ECONOMICS
FLORIDA STATE UNIVERSITY

Project SCAT, Osceola County School District, P.O. Box 1948, Kissimmee, Florida 32741
(305) 847-3147 SUNCOM 352-7440

Printed in conformity with applicable state laws. Cost factors available on request from SCAT Publications Office.